- First chemi-groundwood newsprint mill
- Advantages of the gas turbine in pulp and paper
- Flow control variables in basis weight control
- How to extend roll life

The Paper Industry

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*Results will vary with feed and pressure conditions.

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SINCE 1889

A Division of WHITING Corporation

Pulp Washers • Evaporators
Filters • Digester Blow Condensers
Turpentine Condensers

Chinese fruit dish of tinned copper, with Yang-Yin symbol featured as centerpiece design.

This symbol (Yang-Yin) represents T'ai-chi, the old Chinese *Ultimate Principle*, and as such, perfection. As the Asten-Hill trademark it symbolizes the *best* in paper mill DRYER FELTS.

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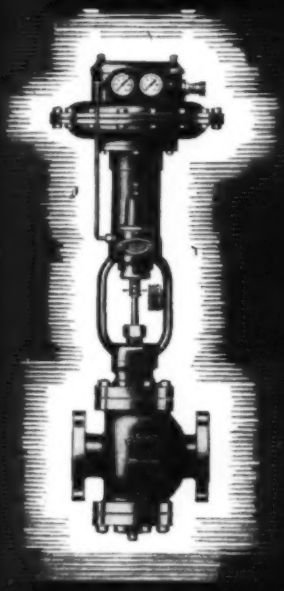

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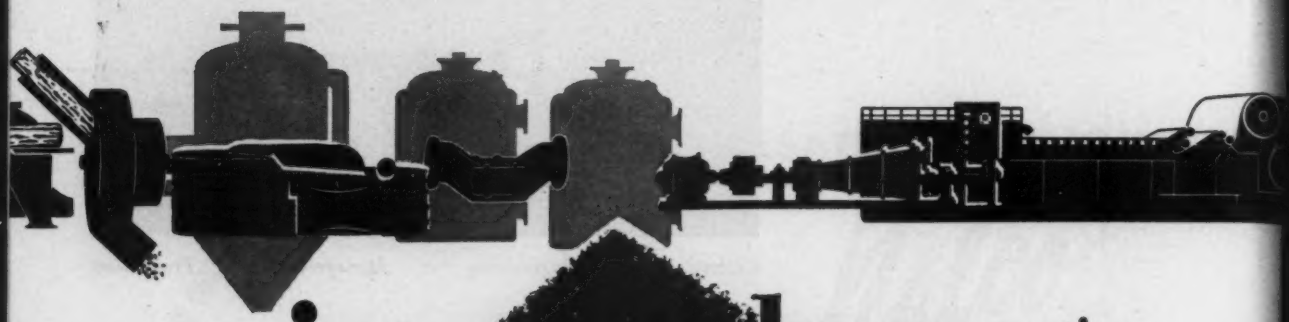

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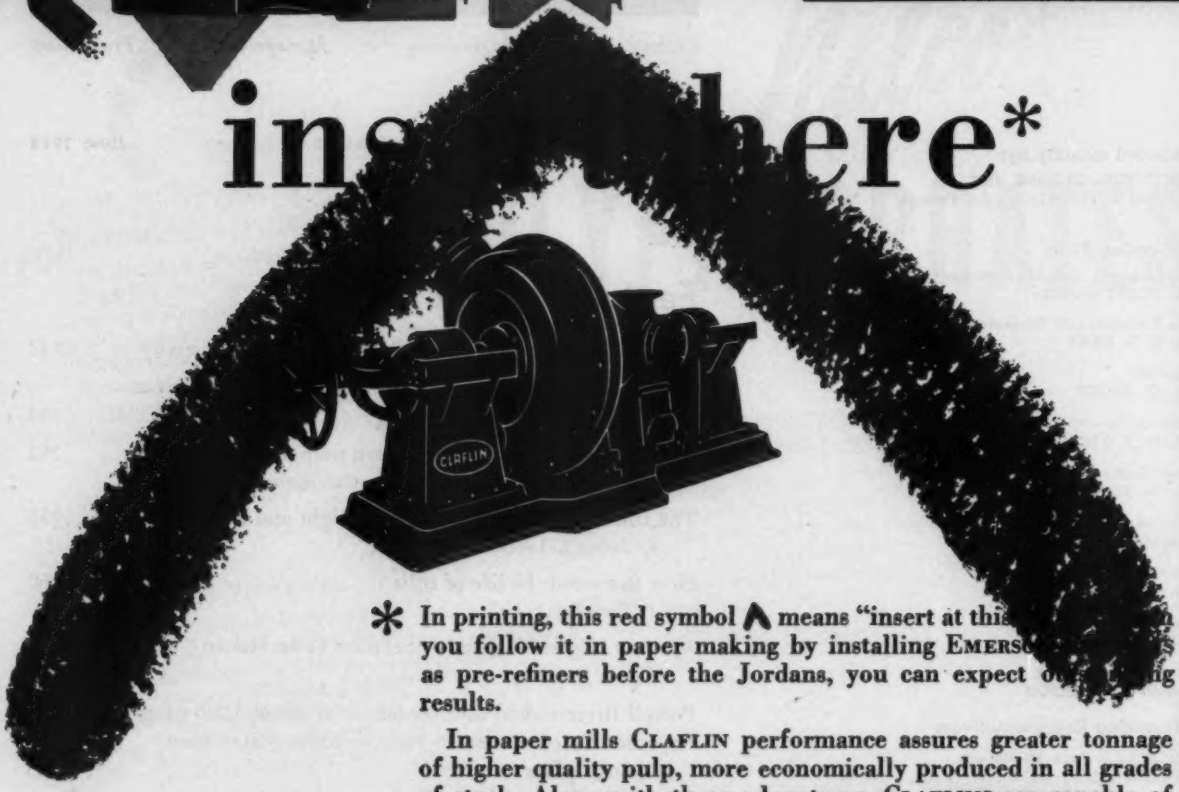

* In printing, this red symbol ^ means "insert at thi[illegible] you follow it in paper making by installing EMERS[illegible] as pre-refiners before the Jordans, you can expect o[illegible]g results.

In paper mills CLAFLIN performance assures greater tonnage of higher quality pulp, more economically produced in all grades of stock. Along with these advantages, CLAFLINS are capable of increasing by three to four times the beating production in tons per day. Reductions of from one quarter to one half in power consumption also are possible.

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CLAFLINS are now made by EMERSON, a name synonymous with precision craftsmanship in stock refining equipment.

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To us in the Bolton organization, the education gained in a half century of service to the pulp and paper industry is the most important measurement of our success. For it makes us better prepared to keep pace with the swiftly changing conditions brought about by new methods, new materials, and scientific developments in paper manufacture.

We enter our second half century with confidence in our continued ability to lead the way with better equipment and with improved service based upon intelligent understanding of our customers' needs.

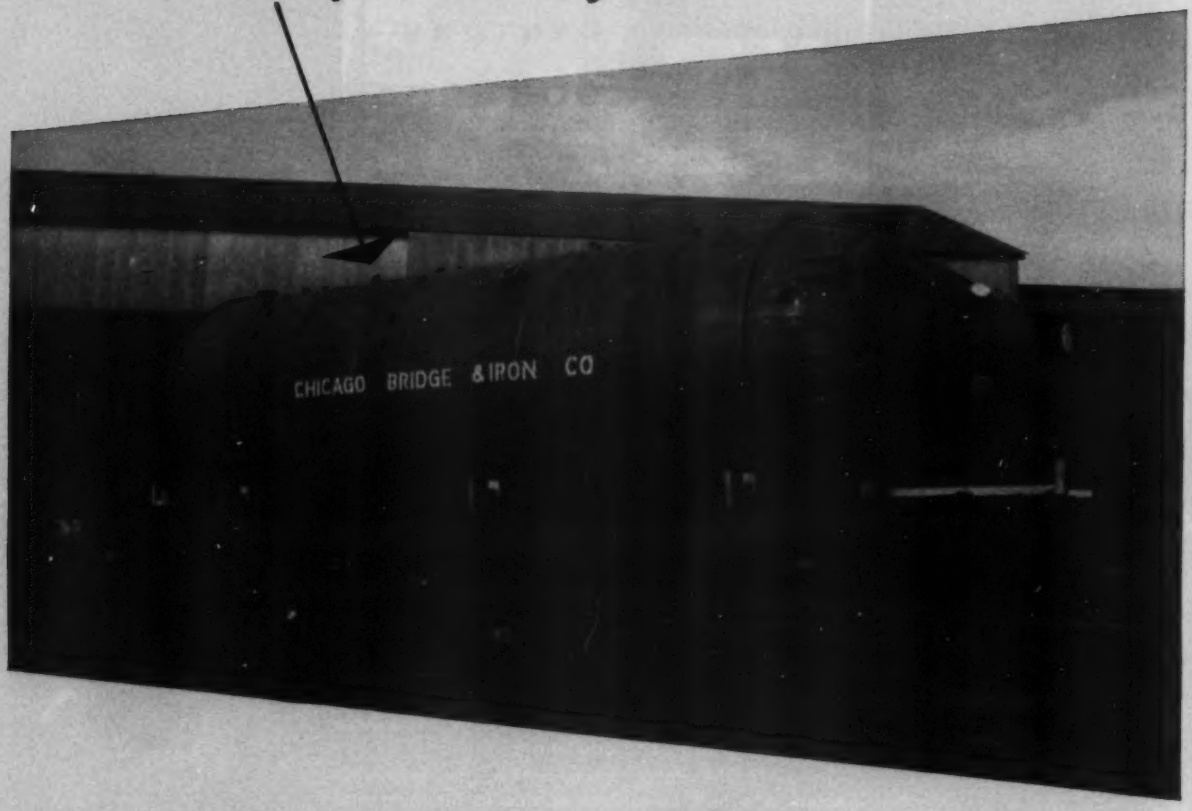
John W. Bolton & Sons, Inc.

Lawrence, Massachusetts, U.S.A.

For a copy of our anniversary booklet, write to Dept. S, John W. Bolton & Sons, Inc., Lawrence, Mass.

THINK HARD...

Doesn't this digester look familiar to you?



Yes, it probably does look familiar to you with that name on the side. But the chances are you've never seen this particular digester before because it's one of four recently built by CB&I for the Mead Corporation at Chillicothe, Ohio. Building digesters like this for the pulp and paper industry is a regular part of our operations.

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Performance-- Value...

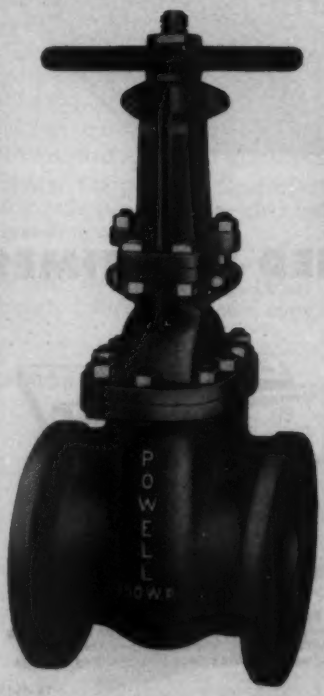
FIG. 2193 (Sectional)—
Large size, Ni-resist
Gate Valve For 200
Pounds W.O.G.

FIG. 559—Iron Body
Bronze Mounted Swing Check
Valve For 125 Pounds W.S.P.

. . . POWELL VALVES . . . THE COMPLETE QUALITY LINE . . . POWELL VALVES . . .

FIG. 500—Bronze Screwed-In
Bonnet Gate Valve For
125 Pounds W.S.P.

FIG. 2453-G—Stainless Steel
O.S.&Y. Gate Valve For 150 Pounds.



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You can depend on outstanding *performance* from every valve made by The Wm. Powell Company, for Powell Valves have a proven record of long life and dependable service.

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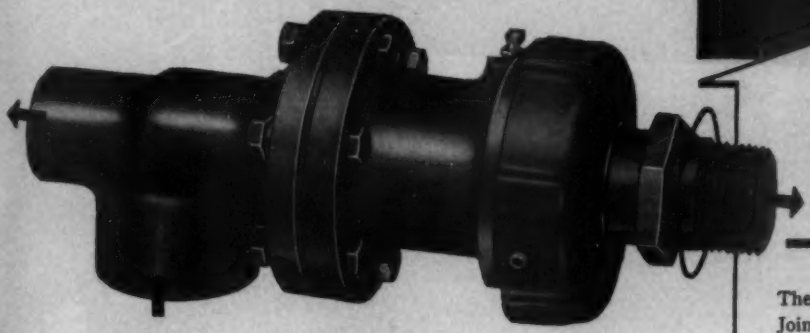
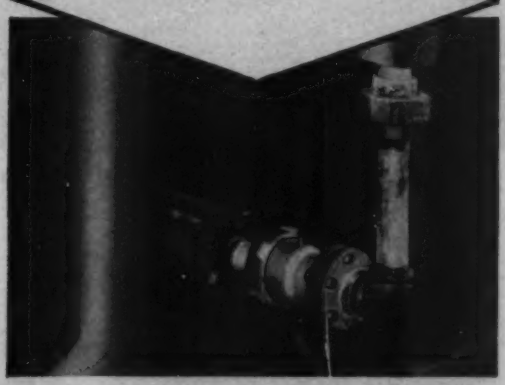
TA-5019(P)

BARCO REVOLVING JOINTS



ON JOB 4 YEARS —NO REPAIRS!

These 1" Barco Type IBR Revolving Joints shown in the accompanying photographs (syphon style, above; single flow style, below) handle 45 psi steam at 20 to 30 RPM and run up to 8 hours per day. Their record of four years' service without repairs under normal conditions of temperature, pressure, and speed shows that BARCO IS YOUR BEST INSURANCE FOR LONG, TROUBLE-FREE SERVICE when you need *rotary steam joints* on rolls, dryers, drums, calendars, and mixers.



Performance that Pays Dividends IN PAPER MILLS

HOW MUCH is it costing you to use less efficient types of rotary joints? . . . For Repair Parts? . . . For "Down Time"? . . . For Extra Power Costs? CHECK YOUR RECORDS—then look at these Barco advantages:

- Trouble-free Performance! Thanks to long lasting "CTR" V-Type Seal Rings—a Barco Development.
- Low Maintenance; No Adjusting. Easy to inspect or service, with no special tools required.
- Low Torque—Cuts Power Costs up to 50%—particularly, at higher pressures.
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- Better Temperature Control where steam is used for heating rolls due to better circulation. Barco Joints hold seal standing or running.

You can prove it on your own equipment! Make this test now with new, improved Barco Revolving Joints. Send for complete information and a copy of Catalog No. 300.

● CATALOG 300

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BARCO MANUFACTURING CO.
8260 Hough St., Barrington, Illinois

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Company_____

Address_____

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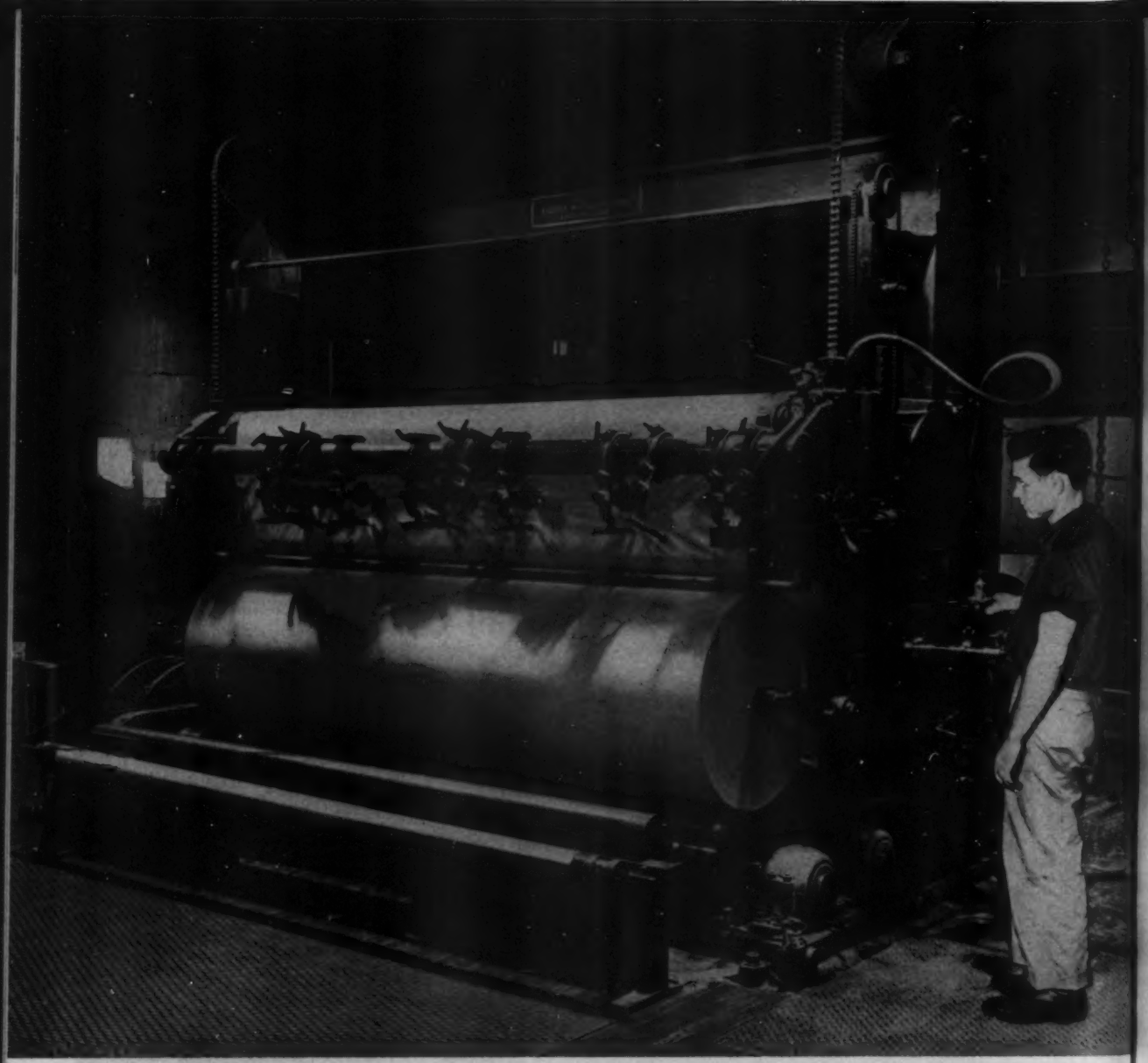
- ☐ Series 250 for higher pressures. Sizes 2½" and 3".
- ☐ Heavy duty joints. Sizes up to 5".
- ☐ High speed Type NV joints. Size ¼".



Kidder Senior Superspeed Winder in a Paper Mill — making "ready to ship" dust-free rolls.

You need all 3 in a modern mill winder

1. *High Production* — Designed for continuous duty, high-speed operation, with a minimum of down time.
2. *Shear Cutting* — Kidder has always employed the shear-cut method for accurate, long life, dust-free slitting, assuring positive roll separation.
3. *Low Maintenance* — Gearless design — ample capacity anti-friction bearings — dynamic balancing — long-life shear slitters — all contribute to low maintenance and uninterrupted operation.

Since W. P. Kidder built his first Slitter and Winder in the 1890's, a continuous program of engineering development has kept Kidder ahead of the field. Kidder was the first to offer gearless drives, pneumatic counterbalance of the rider roll, and among the first to offer all-electric tension control and electric eye side guiding.

For leaflet giving details of these modern Slitters and Winders, write to the Kidder Press Company, Dover, N. H.

Kidder

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Dust-Free Operation
Easy Roll Separation

No other drive does all these jobs like

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COMBINING the flexibility and quietness of a belt with the positive action and durability of a gear — Link-Belt Silent Chain offers unmatched advantages for a wide range of drives. Check these reasons why:

- Lower cost—often lower in first cost, always lower in ultimate cost.
- Longer life — trouble-free performance for 25 or 30 years is common.
- No dismantling machine or removing sheaves for repairs.
- Better than 98% efficiency.
- Maintained ratio assures full productive capacity.
- Slipless action assures a better product.
- Easy to install.
- Safe to employees — operates in oil-retaining casing.

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LINK-BELT

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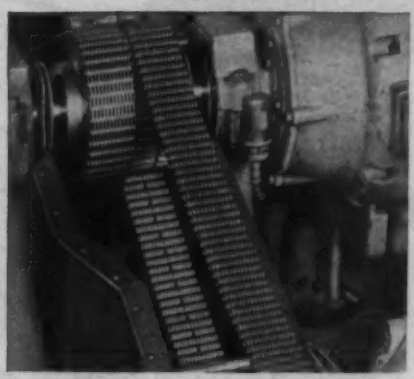
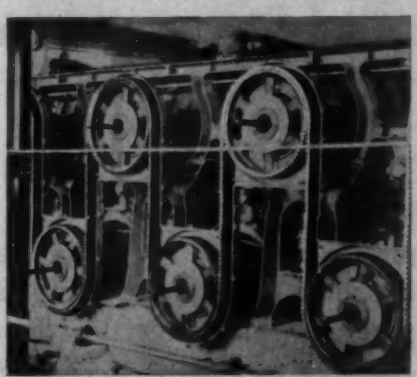
1 **Production increased 33%** when speed of this peeler lathe was stepped up by installing two silent chain drives. Neither engine nor lathe had to be moved.



2 **Constant, high speeds** were assured by equipping each of 48 automotive test stands with two Link-Belt Silverstreak Silent Chain Drives.

3 **Long life under severe service**—This 250-hp Link-Belt Silent Chain Drive has operated line shaft in cold draw section of seamless tube company since 1916.

4 **Fractional hp drives** are positive and dependable with Link-Belt Silent Chain. Above, two 3/8" pitch chains drive machine fabricating refrigerator parts.



5 **Accurate timing** is guaranteed for this dryer by Link-Belt Duplex Silent Chain. All shafts travel at uniform angular velocity, permitting precise coordination of process.

6 **Minimum maintenance**—This is one of 24 Link-Belt Silent Chain beater drives in a pulp mill. All have operated for many years with little attention.

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CLEAN ROLLS

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Whatever your doctoring problem, LODDING has the answer. LODDING is your *only* source for *all* these Doctor Blade materials: K Monel . . . Spring Steel . . . Alloy Steel . . . Stainless Steel . . . Phosphor Bronze . . . Laminated Plastics . . . Abrasive.

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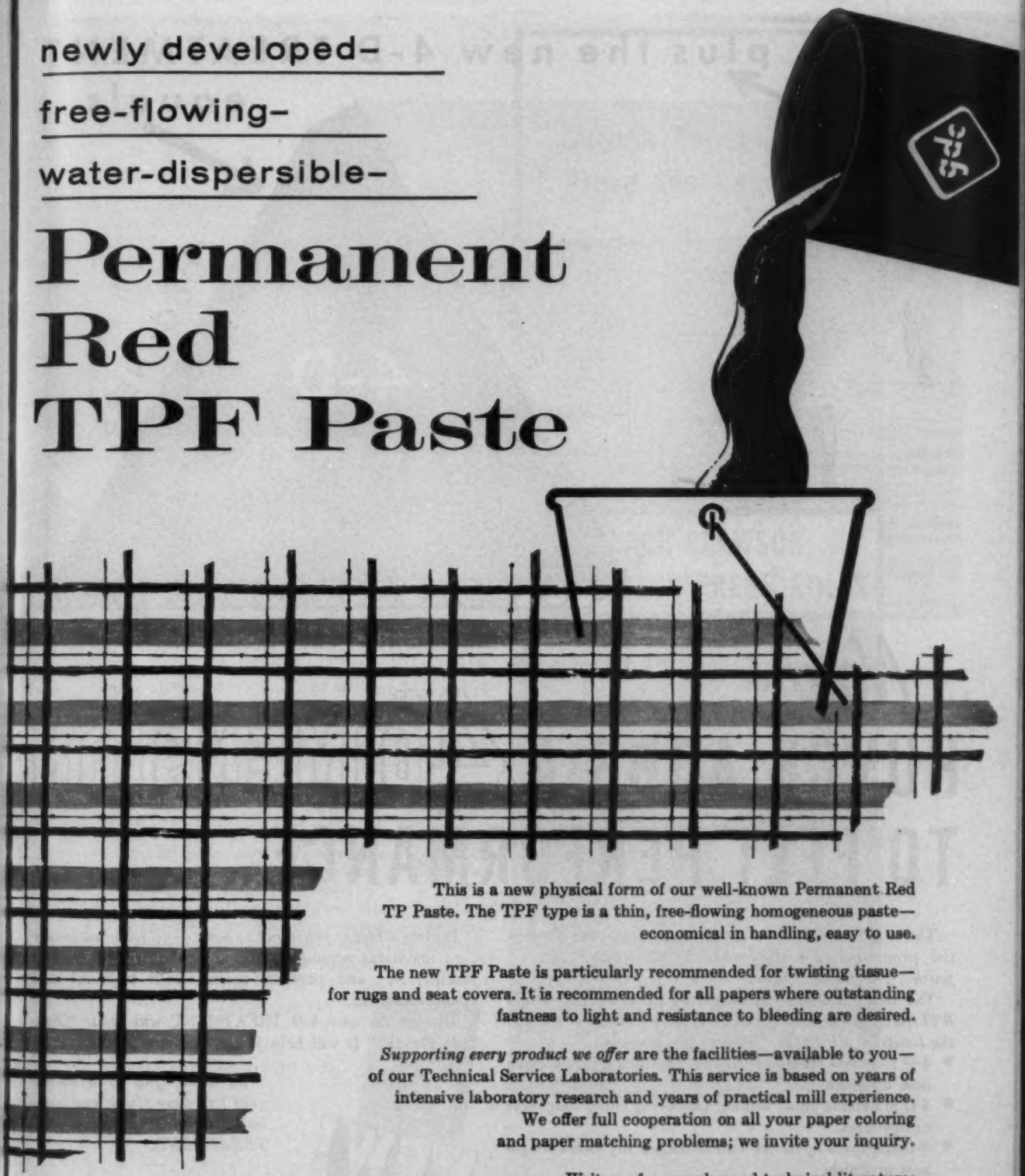
free-flowing–

water-dispersible–

Permanent Red TPF Paste



This is a new physical form of our well-known Permanent Red TP Paste. The TPF type is a thin, free-flowing homogeneous paste—economical in handling, easy to use.

The new TPF Paste is particularly recommended for twisting tissue—for rugs and seat covers. It is recommended for all papers where outstanding fastness to light and resistance to bleeding are desired.

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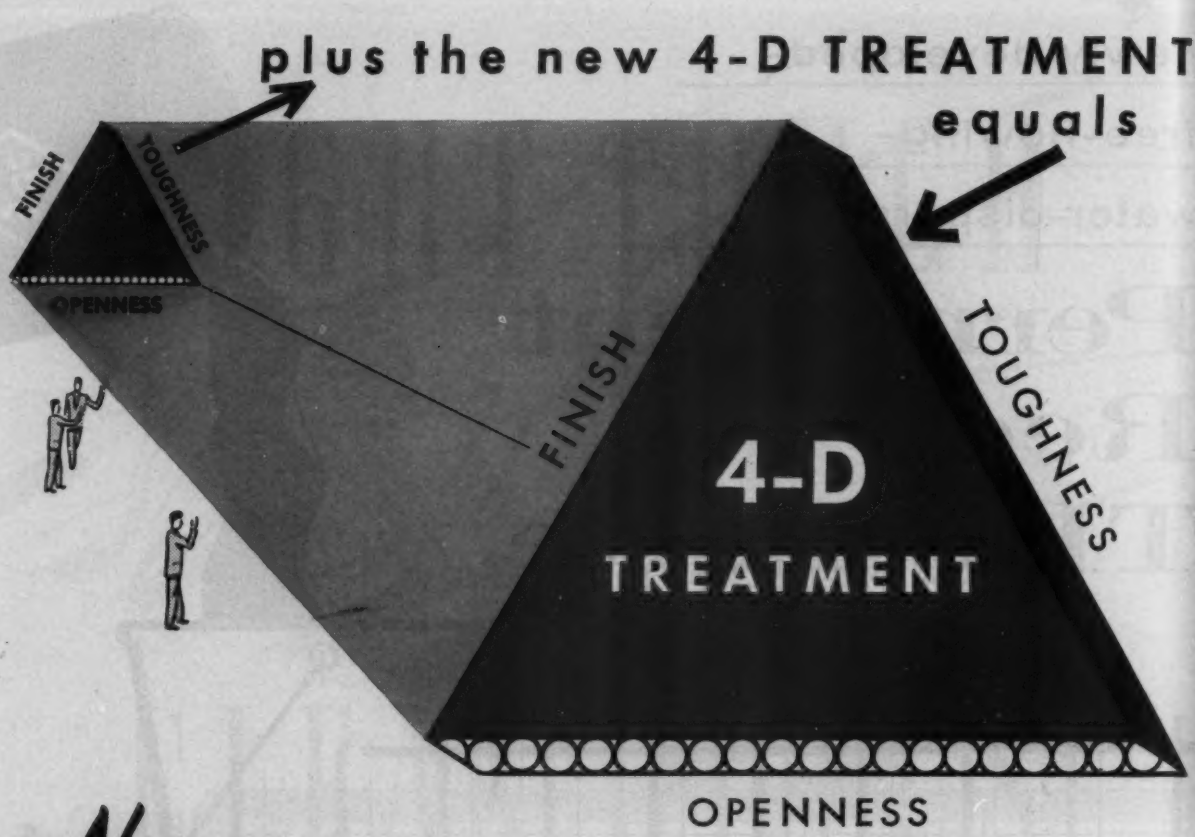

Now—

HUYCK ADDS A 4TH DIMENSION TO FELT PERFORMANCE . . .

The two triangles * you see above illustrate the 3 essential properties of a papermaker's felt — *toughness* . . . *finish* . . . and *openness*.

The small triangle represents the limits of felt design *WITHOUT 4-D*. The big triangle shows how *4-D extends the limits of all design "legs" of the triangle.*

- 4-D increases toughness without sacrificing either openness or finish.
- 4-D maintains finish without sacrificing either toughness or openness.
- 4-D improves openness without sacrificing either toughness or finish.

In fact, 4-D improves TOUGHNESS and FINISH and OPENNESS *all at once.*

Thus, 4-D adds a real *Fourth Dimension* to felt design.

The end result of long and intensive research — the new 4-D TREATMENT is a thoroughly tested and proved chemical formula that actually changes the physical and chemical characteristics of wool fibers.

It gives a *higher resistance* to wear — so *felts last longer* . . . maintains openness and softness . . . improves size stability . . . and protects against both bacterial and chemical attack.

Discuss the new 4-D TREATMENT with your "Man-from-Huyck." It will help you solve *your* felt problems!

We invite you to write for your free copy of our new booklet describing the new 4-D TREATMENT.

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HUYCK FELTS

FIRST IN QUALITY . . . FIRST IN SERVICE

F. C. HUYCK & SONS • Rensselaer, New York

Established 1870

* A Huyck concept first presented in an article published in PAPER MILL NEWS, May 25, 1935.

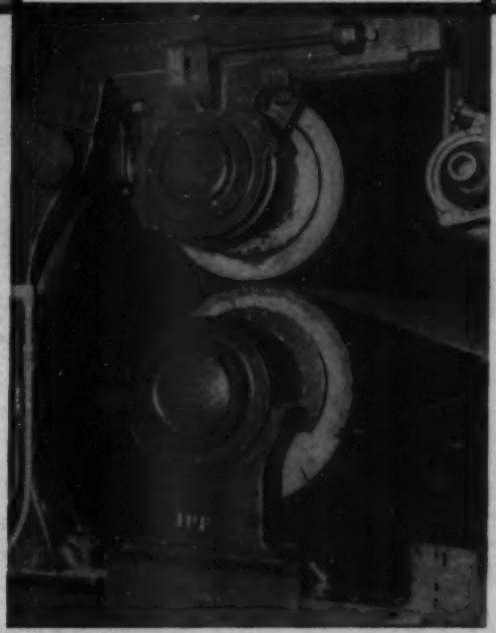
Carbon Paper Tests Prove the Case for

BLACK-CLAWSON CROWNLESS PRESS ROLLS

Recent comparative field tests, the results of which are shown above, involved the use of pairs of conventional press rolls and pairs of B-C Crownless Press Rolls. The procedure was to lay carbon paper between two strips of graph paper and set the top roll down at various pressures to make visible nip impressions.

The differences in nip patterns between conventional press rolls and Black-Clawson Crownless Rolls tell an amazing and interesting story—actually prove that only Crownless Press Rolls can give you uniform nip pressure, uniform water removal and uniform felt wear.

Bulletin 8-BC describes these tests and contains comparative nip impression readings, nip patterns, construction details and other advantages of Black-Clawson Crownless Press Rolls.



Write for Bulletin 8-BC today.

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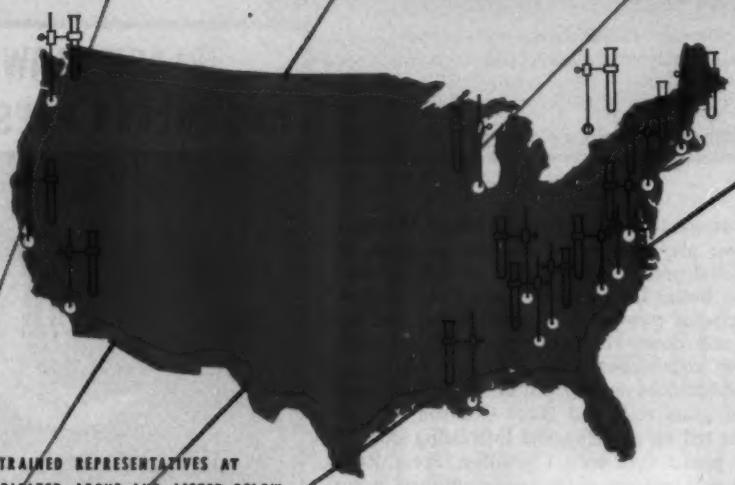

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Our coast to coast network of offices assures you of prompt "in the lab" or "in the mill" technical service wherever you are. Our experience goes far beyond the manufacturing and delivering of dyes for paper. We know that each new operation has its individual aspects and are eager to assist you anytime, anywhere. Adding new profitable colored lines need not be a problem. Simply specify "National Paper Dyes".

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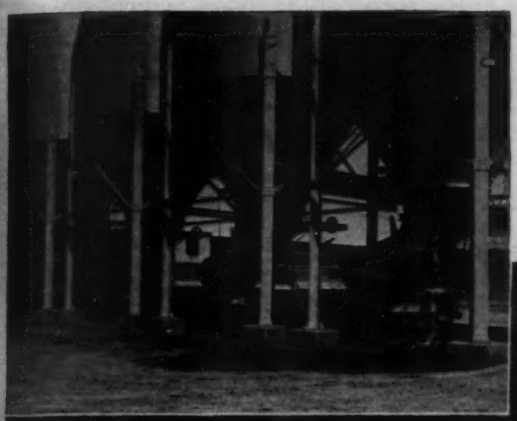
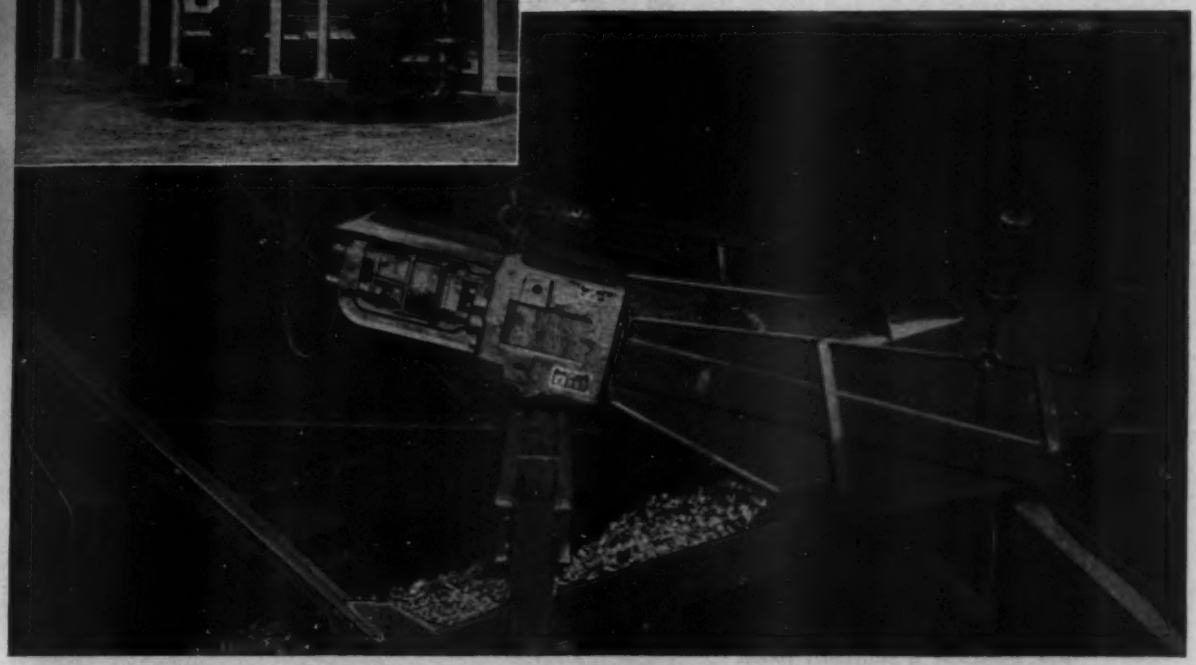


At Left: Battery of four Jeffrey-Traylor 4' x 6' electric vibrating feeders delivering controlled quantities of hard and soft wood chips to collecting belt conveyor in pre-digester process at large southern mill.

Below: Twin Jeffrey-Traylor 54" x 4' electric vibrating feeders delivering chips to screens at large northern mill.



JEFFREY delivers chips when and where you want them

Modern paper and pulp processing demands continuous flow of chips at low overall cost. That's why Jeffrey-Traylor electric vibrating feeders and conveyors have such wide application in your industry. They deliver the chips exactly *when* and *where* you want them.

These versatile units carry up to 200 tons of chips per hour from bins to belt or scraper conveyors. There's a type and size to meet every requirement.

For detailed description of the basic design and operating principles of Jeffrey-Traylor electric vibrating feeders and conveyors—as well as specific information concerning applications — write for technical literature.

THE JEFFREY MANUFACTURING CO.

ESTABLISHED 1877

Columbus 16, Ohio

sales offices and distributors in principal cities

PLANTS IN CANADA, ENGLAND, SOUTH AFRICA

ELEVATORS • SHREDDERS • BELTS • SCREENS • CHAINS
APRONS • SCRAPERS • HOPPERS • STACKERS • SPIRALS

Why a Southern paper mill ordered the...

Giant Economy Size from NEWPORT NEWS

Papermakers usually encounter some perplexing problems when pressure vessels, digesters, tanks or similar large size units are involved.

For instance, a southern paper mill required ten lime storage tanks like the one pictured here. The size, 20 feet in diameter by 40 feet in length, obviously prohibited one-piece delivery by rail.

However, the mill found a way to eliminate field assembly problems and avoid needless labor costs, as well as to save valuable erection time . . . by handing the job to Newport News.

Specialists in metal fabrication, Newport News produced these tanks in the shop, then loaded them on barges for direct shipment, fully assembled, ready for immediate installation upon arrival.

This illustrates how deep water shipping, along with sixty-seven years' experience in building just about any kind of vessel you could name, has enabled Newport News to provide money-saving answers for scores of papermakers.

Papermaking equipment built by Newport News has set outstanding performance records in leading mills at home and abroad. So whether you use *rolls or log barkers . . . head boxes or pressure vessels . . . digesters, tanks or special equipment . . .* let us bid on your needs. Learn how Newport News can help you . . . our illustrated booklet *"Facilities and Products"* is yours for the asking. Write for your copy today.

Nine more to go. You're looking at one of ten lime storage tanks being loaded on a barge for direct shipment from Newport News' plant. Complete assembly of these units in the shop not only saves labor and money but expedites installation upon arrival at the paper mill.

Newport News

Shipbuilding and Dry Dock Company

Newport News, Virginia

STARCHES RESINS with a challenge!

better ways to meet today's paper-making needs

Keeping Abreast of THINGS AS THEY HAPPEN

As the demand for National's specialty starches for paper has steadily increased, so have our production skill and the size of our research team. Expansion underway in our Indianapolis plant is answering the ever-widening use of National products. Our continuing objective is new and better ways to meet the needs of today's paper making. The purpose of this series is to keep you abreast of these developments as they happen.

BEATER ADDITIVE SIMPLIFIES PREPARATION AND HANDLING

Many mills prefer to improve strength factors with Hydroseal, National's cold water swelling beater additive. Hydroseal is added directly to the beater in dry form. No cooking is needed. This saves time in preparation and greatly simplifies materials handling.

Hydroseal absorbs water rapidly and uniformly without lumping in the beaters. Its high resistance to breakdown assures strong fiber bonds and excellent starch retention. Good mullen, tensile, pick and scuff resistance result.

For those mills without facilities for beater addition, another grade, Hydroseal '5' is proving just as effective. Its ability to improve surface finish of kraft liner board and similar grades is of particular interest. Hydroseal '5' is cooked at concentrations up to 5% prior to addition. This insures rapid dispersion with the furnish and eliminates the danger of "fish eyes" in head box additions. Write for technical data.

CATIONIC STARCH OPENS NEW APPROACH TO WET END ADDITIONS

Electrochemical Affinity to Cellulose Fibers Improves Strength Properties

A new kind of wet end additive, National's Cato Starch, is modernizing wet end additions. Cato is chemically modified through substitution of cationic groups in its molecular structure. These groups are electrochemically attracted to cellulose fibers which are receptive to cationic materials. As a result, fibers retain more starch. Fiber bonding is stronger. Less additive is needed to improve the quality of a variety of papers ranging from fine writing and printing to kraft grades.

Cato is one of the more recent products of National's continuing research and development work with basic starch and starch derivatives for the paper industry. It has been used with good success for improvement of such strength factors as mullen, pick, fold and tensile with sulfite, sulfate, soda and groundwood pulp, as well as with reclaimed stock and bogus kraft. Small quantities of Cato are effective. The greatest percentage increase generally occurs with the addition of from ¼ to 1% on the weight of dry pulp. Moreover, small amounts often give very excellent retention of fillers and pigments.

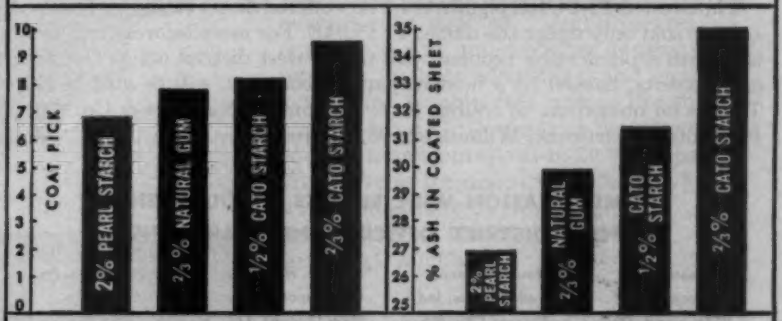
A growing list of mills is finding that Cato improves formation and reduces fuzz. Stock drains freely on the paper machine wire, often permitting faster machine speeds without impairing paper strength.

Cato is easily prepared by cooking at concentrations up to 3%. It may be added at a number of points on fourdrinier machines such as the fan pump, machine chest or headbox. On cylinder machines, Cato may be added to the stuff boxes.

For detailed information and technical assistance, contact your nearest National laboratory or sales office.

COMPARATIVE STRENGTH AND OPACITY

(in terms of coat pick and ash content)



The values above were obtained under actual mill conditions. Cato was added at the wet end. Improved formation and increased pick strength in the coating base stock allowed for improved anchorage of the coating color and a resulting increase in coat pick. Since a constant coating weight was applied to the base stock, the increase in total ash may be attributed to increased retention of fillers at the wet end.

RESYNS® National STARCHES

NATIONAL STARCH PRODUCTS INC.
270 Madison Avenue, New York 16, N. Y.

SALES OFFICES
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Ti-Pure® gives bread wrap a "clean white" that sells

Fresh, "clean white" for bread and other food wrap helps complete the sale —both to your customers and the ultimate consumer. And to give bread wrap, waxed board, glassine and parchment lasting, sales-winning "whiteness," there's nothing like Du Pont TI-PURE titanium dioxide pigments.

Applied to bread wrap, TI-PURE improves its printability to make your customers' trade marks distinctive, easy-to-read . . . gives extra brightness and greater opacity. The same attractive combination of premium brightness and high opacity results when TI-PURE is added to other food wrap and container stock.

Time-tested TI-PURE pigments are now offered direct to you by Du Pont, and are sold only under the name, TI-PURE. For more information, or for help with a pigmenting problem, call our nearest district office. Our technical experts, backed by a modern paper laboratory, will be glad to help. There's no obligation, of course. E. I. du Pont de Nemours & Co. (Inc.), Pigments Department, Wilmington 98, Delaware.

DU PONT

REG. U. S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING
. . . THROUGH CHEMISTRY

PROMPT, NATION-WIDE SERVICE THROUGH THESE DU PONT DISTRICT OFFICES* AND WAREHOUSES:

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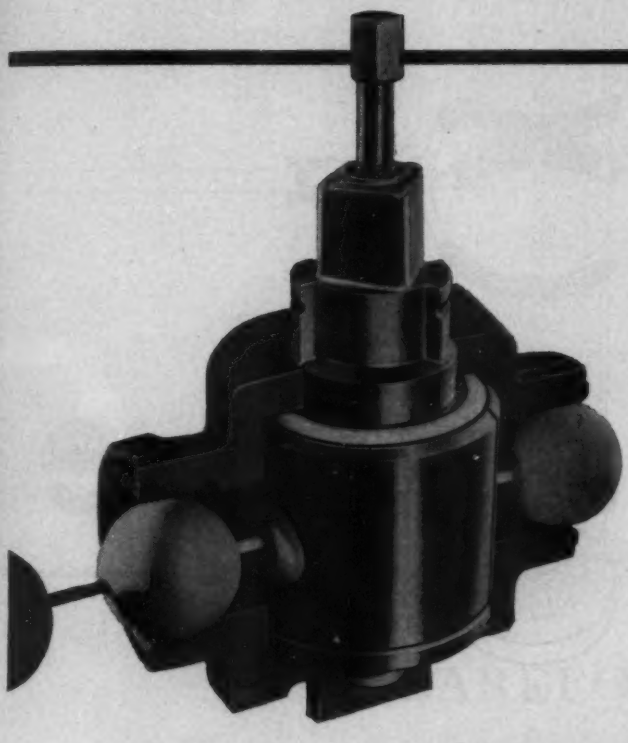
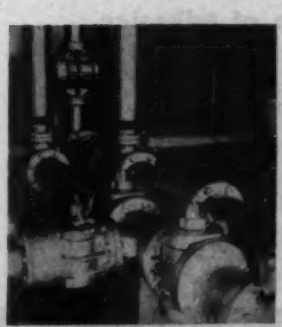
Dallas, Texas	Lockland, Ohio	*New York, N. Y.	*San Francisco, Calif.
*Detroit, Mich.	Louisville, Ky.	*Pasadena, Calif.	Seattle, Wash.

ROUND HOLES *FOR* ROUND PEGS



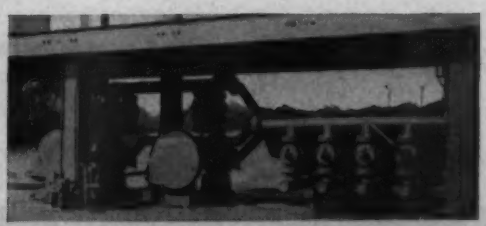
That's an elementary lesson. And that's one of the big advantages of acf Cylindrical Round Port Valves. Because they are the exact size and shape of the pipe itself . . . they assure smooth, unrestricted flow of the most heavy viscous ladings. No obstructions. No loss in head pressure. No turbulence and harmful abrasive effects from solids in suspension. Just the utmost in flow perfection!

Remember, too, *both* acf Round Port Valves and Rectangular Port Valves feature quarter-turn shut-off . . . full pipe area opening . . . and non-wedging design. All together . . . these advantages add up to extra long, trouble-free service life that really *s-t-r-e-t-c-h-e-s* your maintenance budget. Representatives in 50 Principal Cities. Write for descriptive Catalog PI-6, acf Industries, Incorporated, Valve Division, 1501 E. Ferry Avenue, Detroit 11, Michigan.



Proved Best on Raw Sewage Lines

On Chemical Plant Applications

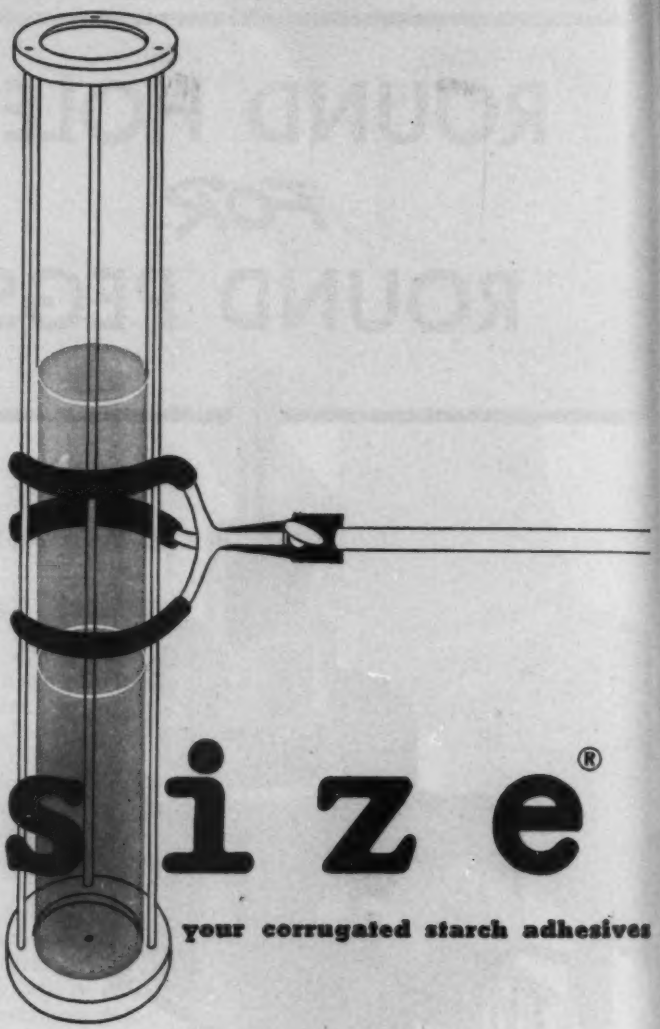


In the Petroleum Industry

acf CYLINDRICAL FULL PIPE AREA **PLUG VALVES**

Only 20/100 of 1% **KELSIZE** in your starch adhesive formula stabilizes its viscosity to produce smoother, more uniform flow. You secure closer control of glue application for faster machine speeds and more uniform operation. You use less adhesive, but get the adhesive where you want it, where you need it! You reduce washboarding, increase machine speeds, secure stronger, stiffer, more uniform board. Scrap and waste are substantially reduced!

Contact our technical service department to get complete information on the measurable benefits of **KELSIZE** in your starch corrugated adhesive.



Use

Kelsize®

to stabilize viscosity of your corrugated starch adhesives

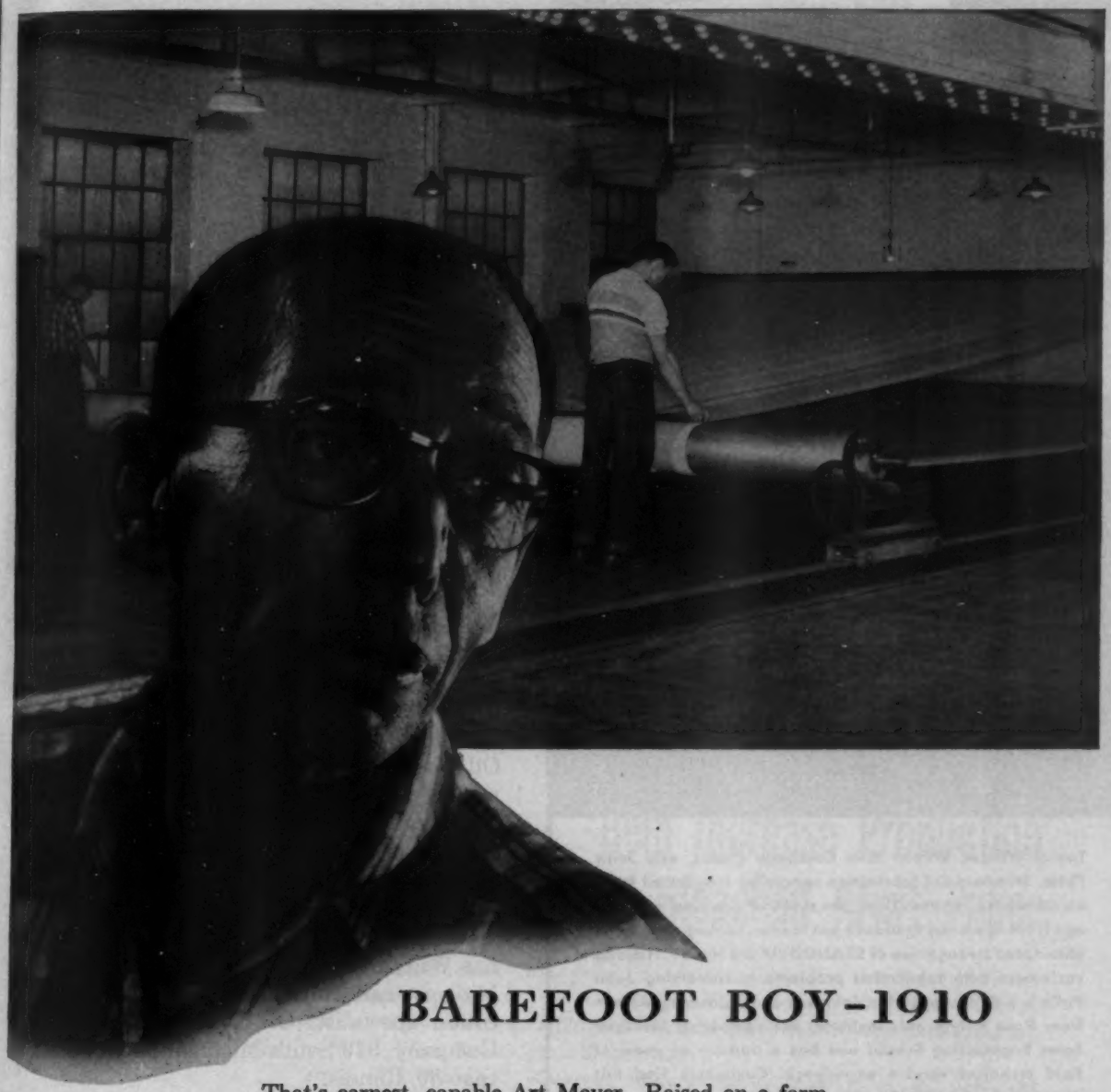
uniform flow properties insure even pick up of adhesive,

uniform operation,

uniform board less waste!

KELCO
DIVISION
REFINED ALGIN PRODUCTS

product of
Company



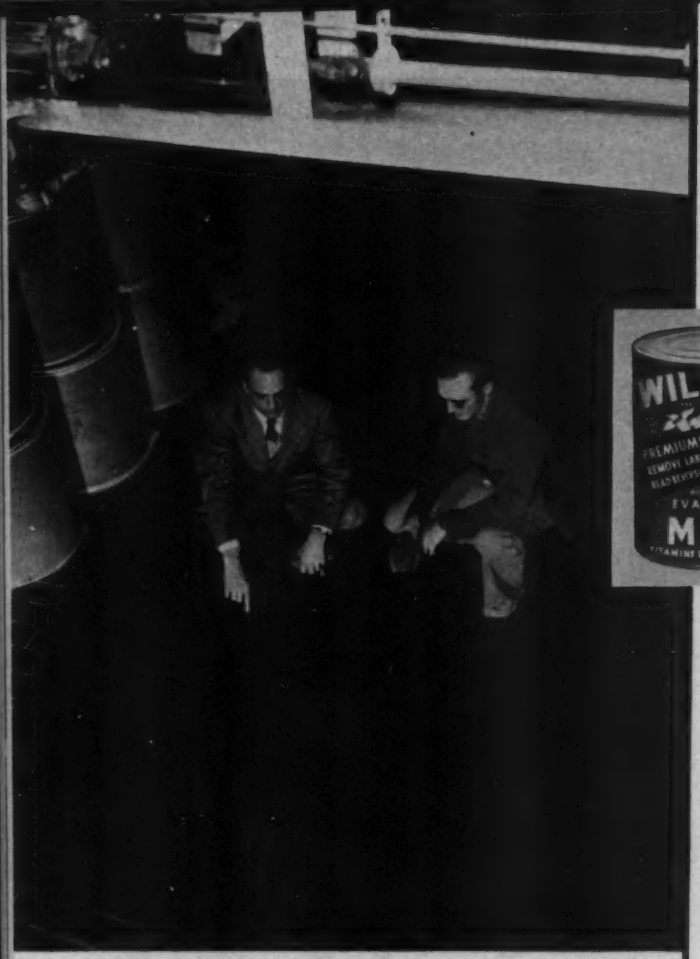
BAREFOOT BOY-1910

That's earnest, capable Art Meyer. Raised on a farm, Art was a crack rabbit hunter, but he never skipped a daily chore. And for 30 years his on-the-job reliability has been reflected in the dependable performance of the felts he helps produce. Art's in the dry finishing section—a specialist in the napping operation which teasels soft felt surfaces for certain paper-making requirements.

The skill and experience of Art Meyer, and others like him, are characteristic of the Appleton Woolen Mills . . . a 73-year-old organization dedicated to development, progress, and the production of ever finer felts—for the finest paper-making.

APPLETON WOOLEN MILLS

APPLETON, WISCONSIN



Taylor Wiham, Wilson Milk Company (right), and John Pirtle, Standard Oil lubrication specialist, inspect oil stain on otherwise spotless floor, the result of previous oil leakage from overhead hydraulic bin loader. Leakage has been eliminated through use of STANODRIP Oil No. 29. Helping customers with lubrication problems is something John Pirtle is well equipped for. John has an engineering degree from Rose Polytechnic Institute, has completed Standard Sales Engineering School and has a number of years of field technical service experience. Customers find this experience and training pay off for them.

STANODRIP Oil whips lubrication problem at Wilson Milk Company

MANAGEMENT OF THE Wilson Milk Company plant, Sheridan, Indiana, had a serious lubrication problem. STANODRIP Oil solved it.

In overhead bin loaders, hydraulic rams push powdered milk along conveyor chute to weighing machine. Leakage of lubricant from rams on the floor below caused a sanitary and safety problem. Packings were replaced every two months but leakage often recurred as early as two weeks after packing replacement.

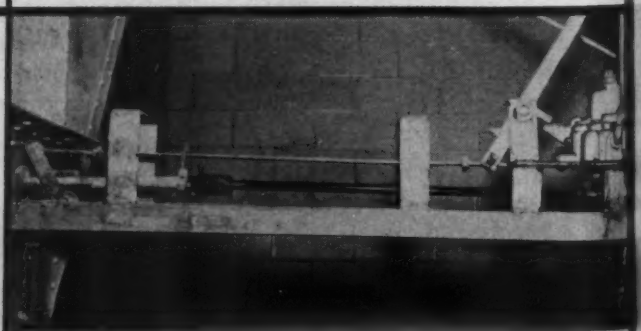
Then Mr. Taylor Wiham, Assistant Superintendent, called in John Pirtle, Standard Oil Industrial lubrication specialist. Mr. Wiham asked about STANODRIP Oil and its possible use as a solution to this lubrication problem. Decision was made to convert to STANODRIP Oil No. 29. Old oil was removed, packings replaced and STANODRIP installed.

In more than 8 months since installation of STANODRIP Oil, there has been no leakage, no packing replacement. Hydraulic rams are lubricated without oil dripping or creeping.

Maybe STANODRIP Oil can serve you as it has Wilson Milk Company. Find out. In the Midwest, call your nearby Standard Oil lubrication specialist. Or contact Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.

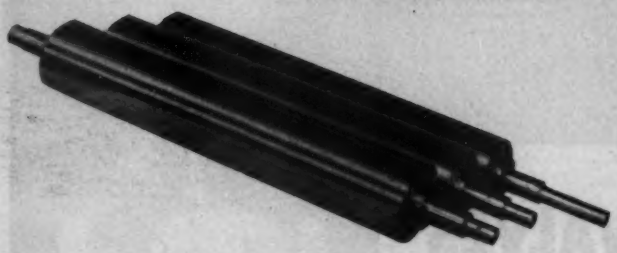
STANDARD

STANDARD OIL COMPANY
(Indiana)



Three bin loaders like the one shown here dripped oil until converted to STANODRIP. No leaks have occurred in 8 months since. Previously, packings were replaced every two months. Even then leakage often recurred as early as two weeks after repacking.

In Potlatch Forests' New High-Speed Mill



WELDCO ROLLS

Help Increase Production Of Bleached Kraft Paper

Today's high-speed kraft paper production calls for the finest, newest, most efficient equipment. So when Rice-Barton Corp. designed Potlatch Forests' new 196" machine, WELDCO Stainless Steel Roll Covers were specified for the Wire, Wire Stretch, and Breast Rolls.

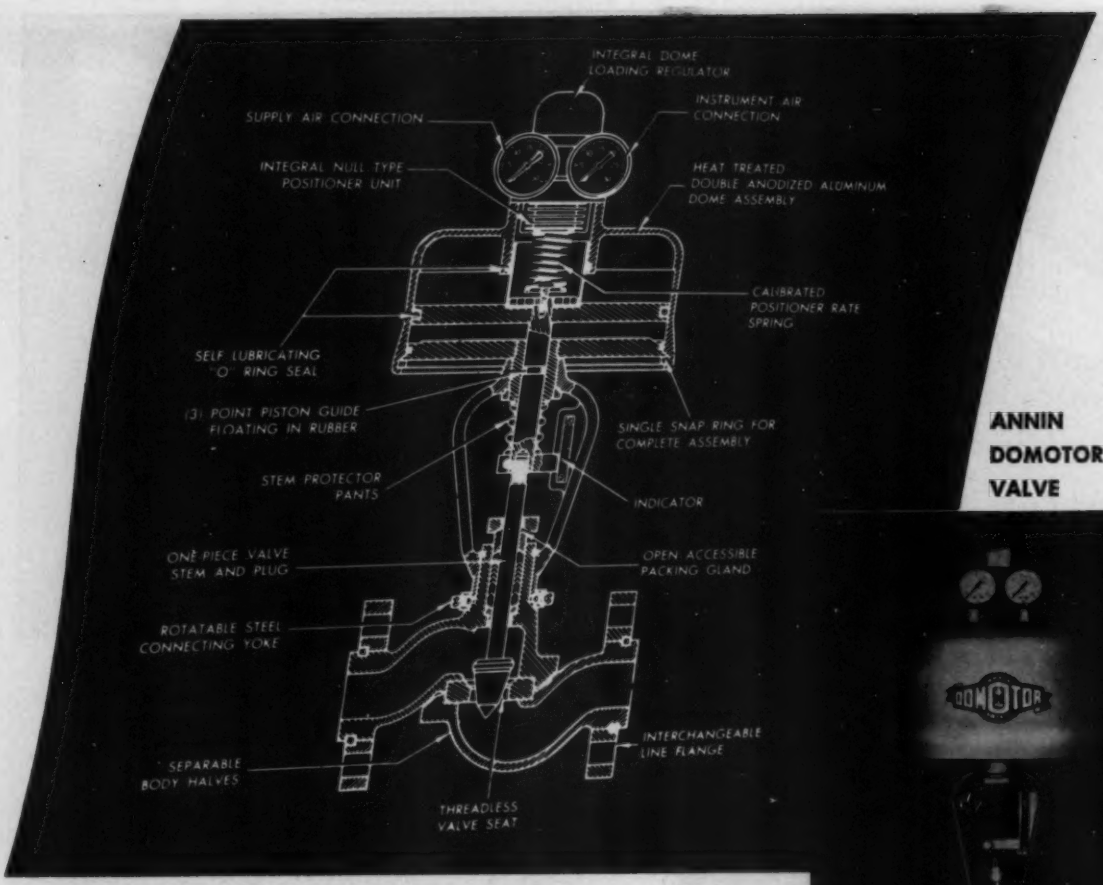
You'll find WELDCO—Covered Rolls in many other mills, too, because they offer maximum corrosion-resistance, have superior wettability, reduce friction, increase felt life, and lessen wear on fourdrinier wires. They give years and years of economical service, with a minimum of maintenance.

Both new and old rolls can be covered with Stainless Steel, Monel, Nickel, Inconel, or other alloys, through the patented WELDCO "Pressure Welding" process. For your next machine — whether new or reconditioned — be sure to specify WELDCO Rolls. Ask your paper machinery builder about them, or contact . . .

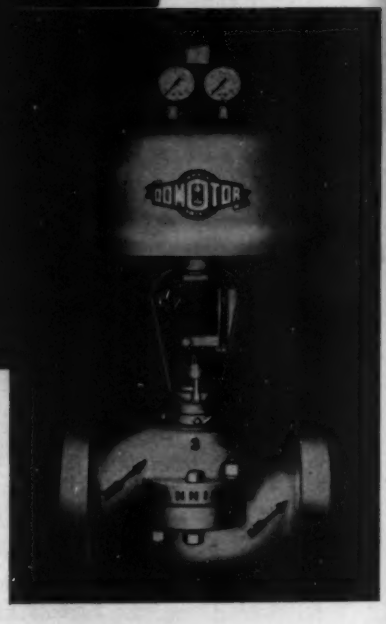
WELDCO

THE YOUNGSTOWN WELDING & ENGINEERING COMPANY

3715 OAKWOOD AVENUE · · YOUNGSTOWN 9, OHIO


INTEGRAL DOME LOADING REGULATOR
SUPPLY AIR CONNECTION
INSTRUMENT AIR CONNECTION
INTEGRAL NULL TYPE POSITIONER UNIT
HEAT TREATED DOUBLE ANODIZED ALUMINUM DOME ASSEMBLY
CALIBRATED POSITIONER RATE SPRING
SELF LUBRICATING "O" RING SEAL
(3) POINT PISTON GUIDE FLOATING IN RUBBER
SINGLE SNAP RING FOR COMPLETE ASSEMBLY
STEM PROTECTOR PANTS
INDICATOR
ONE PIECE VALVE STEM AND PLUG
OPEN ACCESSIBLE PACKING GLAND
ROTATABLE STEEL CONNECTING YOKE
INTERCHANGEABLE LINE FLANGE
SEPARABLE BODY HALVES
THREADLESS VALVE SEAT

ANNIN DOMOTOR VALVE

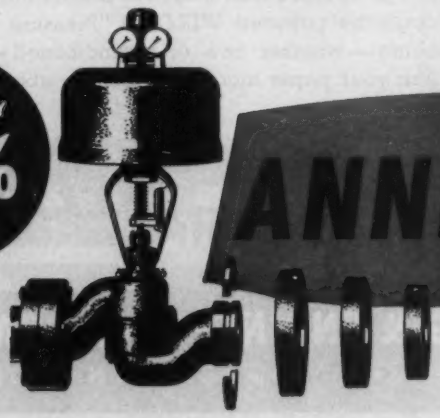


ANNIN STANDARD VALVES HANDLE THE TOUGH JOBS

The Paper Industry from coast to coast now specifies Annin Domotor Valves for pulp mill, bleach plant, power plant and paper mill applications. Only Annin Single Seat Control Valves provide reliable, tight shut-off and meet present instrumentation standards of speed, response and positioning accuracy. Interchangeability of valve bodies, flanges, operators and plug assemblies lowers the initial investment and cuts inventory requirements.

♦ ***WRITE TODAY*** *for illustrated bulletin showing how and why Annin offers the best buy in control valves.*

CUT INVENTORY **50%** WITH



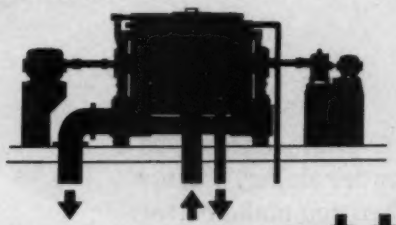
ANNIN *Control* **VALVES**

THE ANNIN COMPANY 6570 E. Telegraph Road
Los Angeles 22, California

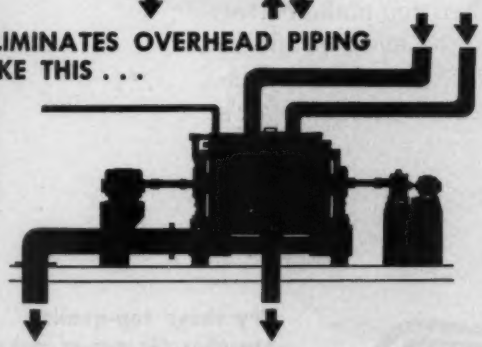
For a Real "Clean Job"–

both in SCREENING and in LAYOUT!

INSTALLED LIKE THIS . . .



ELIMINATES OVERHEAD PIPING LIKE THIS . . .



IMPCO®

IMPCO LINDBLAD PULP SCREEN

As a top performer in pulp screening, the Impco Lindblad has many outstanding features. For instance, due to its unique vat design, at no extra cost to the mill, sub-floor piping is possible. This means significant savings in piping expense on the runs for inlet and outlet piping. The neat arrangement provides uncluttered tending aisles and requires minimum floor space in either single or multi-screen installations.

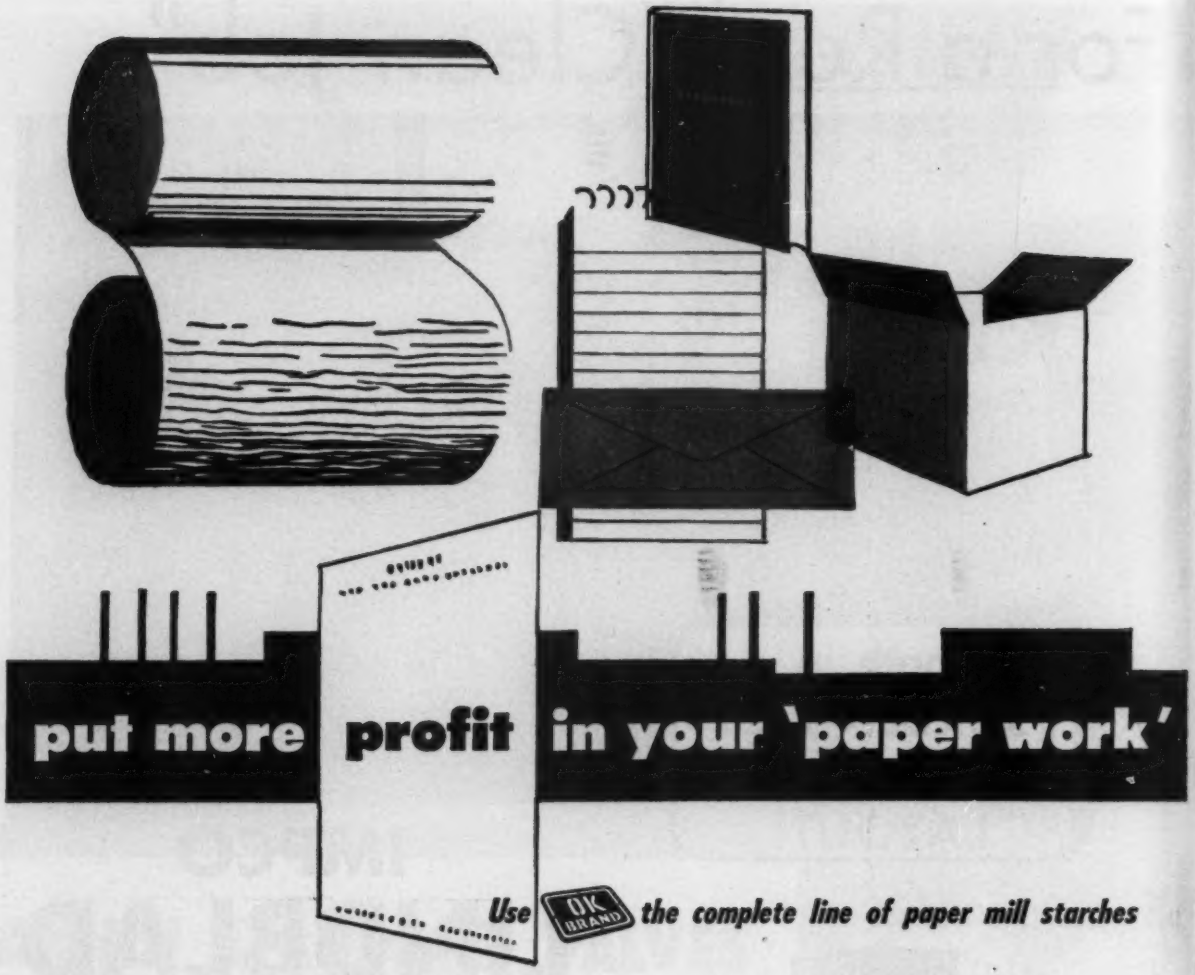
These higher density type vibrating units are delivering quality pulps at densities above 1.5% A.D. in bleached, unbleached, semi-chemical and board mill installations.

For complete information on this screen, send for Bulletin B4-1.

IMPROVED MACHINERY INC.

NASHUA, NEW HAMPSHIRE

SHERBROOKE MACHINERIES LIMITED, SHERBROOKE, QUEBEC
Manufacture Similar Equipment in Canada



The superior quality of OK BRAND starches gives you improved tub, beater, and calender sizing. Better for coating and adhesives, too. When you make better paper at no extra cost — you've put more profit in your "paper work". Try OK BRAND and see! Discuss your special starch requirements with Hubinger's expert technicians.

the stamp of quality

ESTABLISHED IN 1881
THE HUBINGER COMPANY
KEOKUK, IOWA

New York • Chicago • Los Angeles • Boston • Charlotte

OK BRAND

Try these top-quality starches for paper makers:

- OK BRAND Pearl
- OK BRAND E-Type Pearl
- OK BRAND Pearl 700
- OK BRAND Pre-Jel
- OK BRAND Thin Boiling Starch
- OK BRAND Oxidized Starches

Coming Our Way?

UR SUMMER ACATION TRIP

may bring you and your family to our vicinity. Our Newfane Plant is just 20 miles east of Niagara Falls and Old Fort Niagara . . . an area of scenic beauty and historic interest. The Peace Bridge at Buffalo leads to the Queen Elizabeth Way, and the Canadian lakes and woods. We hope you papermaking folks will visit us, If you find yourselves any place near. Drop in, or better still write or call in advance, and we assure a warm welcome, whether for a social call, a business talk or a brief trip thru our mill, where TENAX papermakers' felts are made.

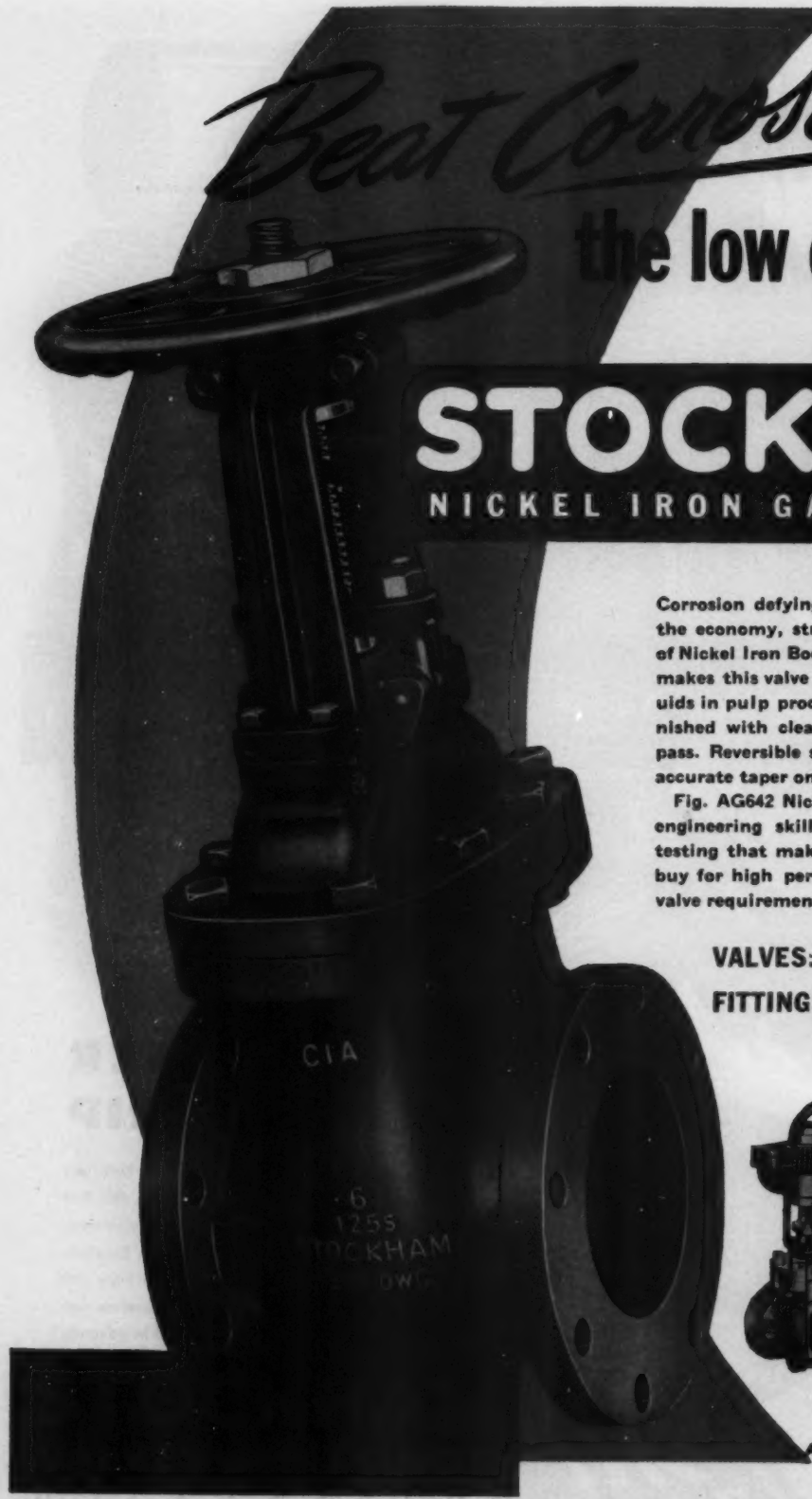
TENAX FELTS

LOCKPORT FELT CO.

NEWFANE, N. Y. • STARKVILLE, MISS.

Serving the Paper Makers Since 1891

Beat Corrosion the low cost way...



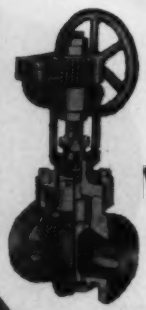
STOCKHAM
NICKEL IRON GATE VALVES

Corrosion defying Stainless Steel Trim . . . plus the economy, strength and corrosion resistance of Nickel Iron Body! That's the combination that makes this valve stand up to line punishing liquids in pulp processing mill service. Can be furnished with cleanouts. Also available with bypass. Reversible solid wedge disc is machined to accurate taper on both sides.

Fig. AG642 Nickel Iron Gate Valves typify the engineering skill, accuracy of detail and rigid testing that make the Stockham line your best buy for high performance at low cost for every valve requirement.

VALVES: Bronze • Steel • Iron Body

FITTINGS: Cast Iron Screwed, Flanged
Cast Iron Drainage
Malleable Fittings & Unions

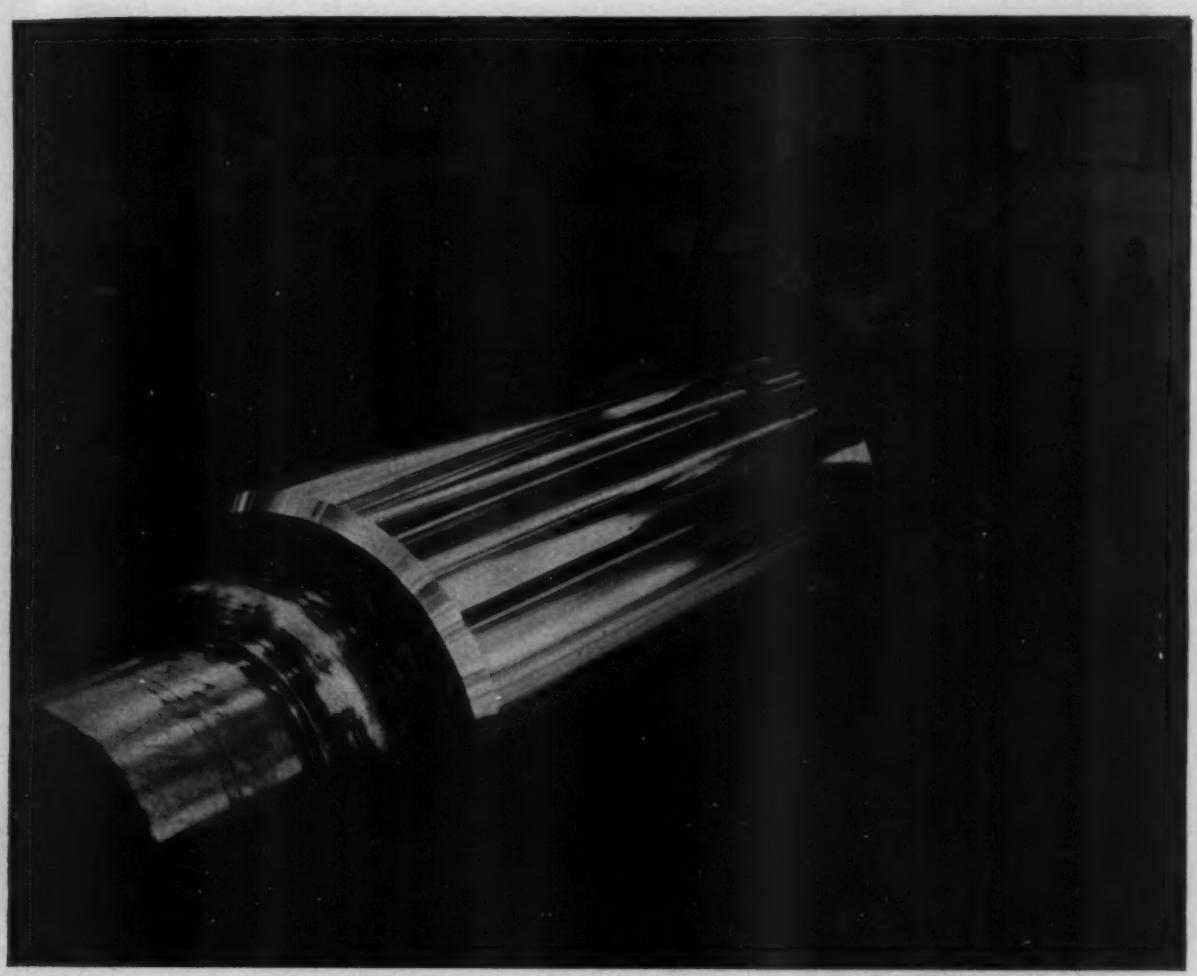


Ask about

WEDGEPLUG
NON-LUBRICATED
STEEL PLUG VALVES

WEDGEPLUG VALVE CO., INC.
NEW ORLEANS, LA.
A Stockham Valves & Fittings Affiliate

GENERAL OFFICES AND PLANT • BIRMINGHAM 2, ALABAMA
Warehouse Stocks and Sales Services Strategically Located
DISTRIBUTED THROUGH WHOLESALERS



MIDVALE STAINLESS STEEL ROLLS

FORGED FOR EXTRA SERVICE... MACHINED FOR BETTER FINISHES

For rolling paper or board . . . from 48 inches to 228 inches across the face . . . higher pressures, faster speeds and wet, corrosive conditions . . . Midvale Rolls are forged to meet them all and provide extra service life with fewer regrinds.

Midvale quality starts with the forging; finest specialty steel, expert heat treating, precision machining and grinding. Midvale Roll performance has been proved in leading mills from coast to coast on wet-end or finish-end calenders or super-calenders.

Whatever your needs in rolls why not consult us? Fine mirror finishes can be furnished to any hardness up to 100 Shore for forged alloy and 70 miminum Shore for stainless steel. Midvale can also supply corrugated and embossed rolls of any size and hardness. Take the first step toward the savings you can realize with Midvale Rolls . . . send for your copy of the folder on hardened and ground rolls.

THE MIDVALE COMPANY- Nicetown, Philadelphia 40, Pa.

Offices: New York, Chicago, Pittsburgh, Washington, Cleveland, San Francisco

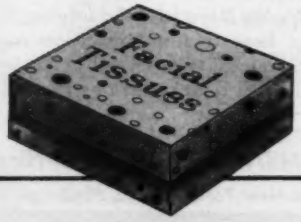
MIDVALE

FORGINGS, ROLLS, RINGS, CORROSION AND HEAT RESISTING CASTINGS

HAM FELTZ says:

"It takes good board to make good packages for consumer merchandise. The Gardner Board and Carton Company makes unusually good board and identifies it with this trademark."

It takes good felts to make board that is good enough for Gardner. Shuler & Benninghofen manufacture extremely fine felts for every paper product from the heaviest board to the thinnest tissue.



Hamilton Felts

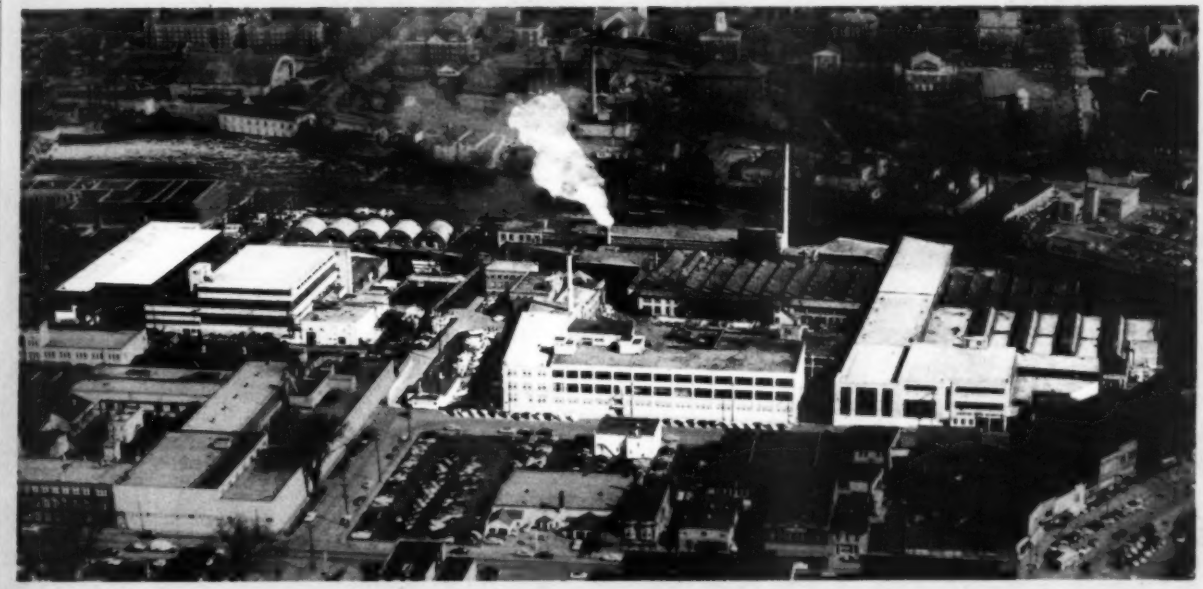
MIAMI WOOLEN MILLS

Established 1858

SHULER & BENNINGHOFEN, HAMILTON, OHIO

The Beloit Album

Beloit Iron Works from the air; conferences with friends; quality control. Newsworthy personalities and events in the world of paper, as seen by the Beloit camera's roving eye



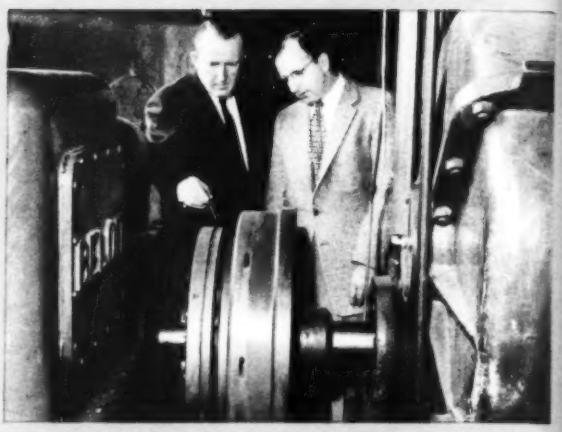
HISTORIC ROCK RIVER forms the eastern boundary of Beloit Iron Works, at Beloit, Wisconsin. Further east across the river is the campus of Beloit College, some of whose buildings can be seen at the top of the photograph. Beloit College was founded in 1847, Beloit Iron Works in 1858. The aerial view shows plant's 16-acre site. Total floor area: 660,000 square feet.

FROM FINLAND three Enso-Gutzeit Co. officials visit Beloit: president William Lehtinen, Lauri Alanko, Pentti Halle. Mr. Lehtinen is shown *(seated, right)* with Beloit chairman, E. H. Neese. Standing: A. G. Olson, Mr. Alanko, H. C. Moore, C. R. Whipple, and Mr. Halle.

SCOTT PAPER CO'S vice-president J. L. Ober and chief engineer A. J. Karpinski discuss new mill installations with members of Beloit Iron Works during a recent visit to Beloit. *(l. to r.)* C. E. Macklem, Mr. Karpinski, H. C. Moore, E. D. Beachler, Mr. Ober, and B. L. Hammill.

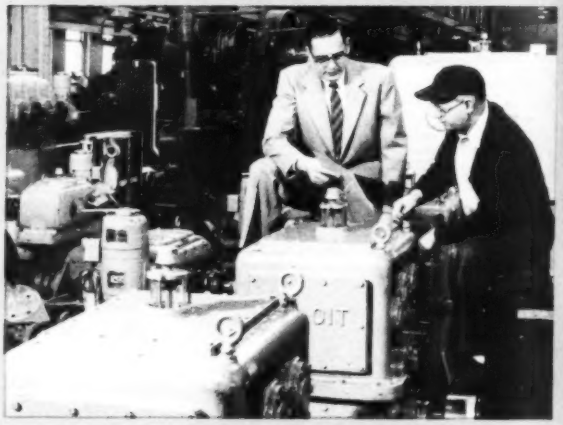
The Beloit Album

Behind the start-up of every paper machine is a record of many men, miles, and machine tools. The Beloit Album brings you some of the highlights, with emphasis on the human factor—for the finest machine is, after all, the product of many hands and minds. Reports from Beloit personnel literally come from "all over the map"—from T. J. Burns, Beloit's Southern representative; from R. A. Goodwillie, of the West Coast office; from G. J. Bertrand, of Beloit's Paris office, covering Central and Southern Europe and the Scandinavian countries; and many others. Customers visit Beloit, too, as is shown in the accompanying pictures. Personal contact is essential. In our book, it is also one of the pleasantest parts of the job—enabling us to meet friends, talk over problems, and make Beloit more truly *"your partner in papermaking."*



ROME KRAFT'S general superintendent L. C. Crowder *(right)* and Beloit's Southern representative, T. J. Burns, examine a differential drive unit on the new Beloit 252" Fourdrinier Board Machine at Rome Kraft Co., Rome, Ga. Differential units link sections of machine mechanically.

WET END REBUILD is here being discussed by E. A. Crawford, engineering manager of the Continental Paper Co., with C. R. Whipple, Beloit sales engineer. Individual attention to each customer's requirements is the primary consideration of the men who directly contact the mills.

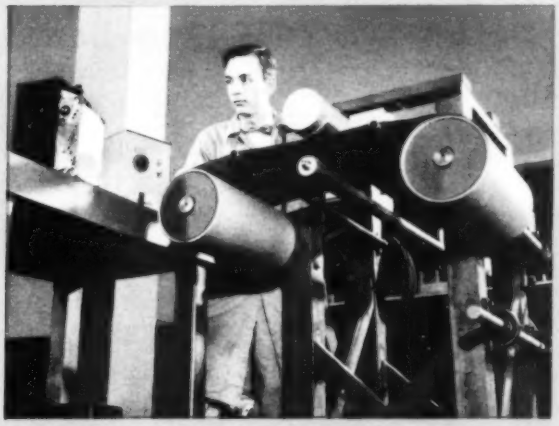


CUSTOMERS' NEEDS get personal attention of D. R. Schamp, Beloit sales engineer, and R. F. Foslin, assistant foreman, shipping floor, here shown looking over a shipment of differential drive units. Daily schedule requires continuous supervision of mills' requirements.

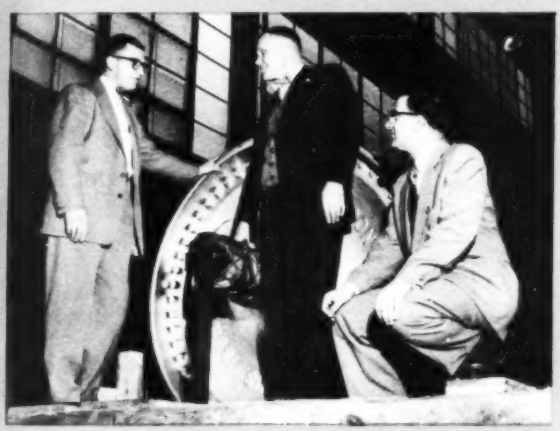
CANADIAN VISITOR R. L. Fraser, resident manager, Manitoba Paper Co. Ltd., discussing a machine rebuild with E. S. Skinner, asst. chief engineer, F. G. Ramsden, asst. sales manager, and L. E. Dennis, staff engineer in the engineering department at Beloit Iron Works.

IMPROVED TISSUE DRYING discussed. Seated *(l. to r.)*: R. Cowles, Marathon-Green Bay; J. Spalding, Marathon-Menasha; F. Nienow, Marathon-Menasha. Standing: B. L. Hammill; E. D. Beachler; H. W. Gochnauer, Marathon-Menasha; R. Robilliard, Marathon-Green Bay.

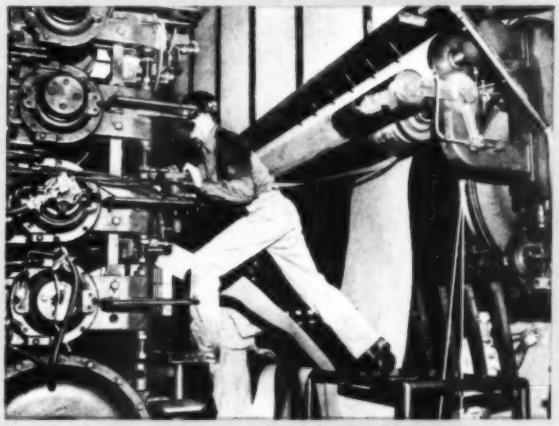
RADIOGRAPHIC INSPECTION includes use of Radioisotope Cobalt 60 in foundry quality control at Beloit Iron Works. Castings are being checked in the above setup, one of the standard procedures to insure continuous improvement in Beloit casting quality and design.



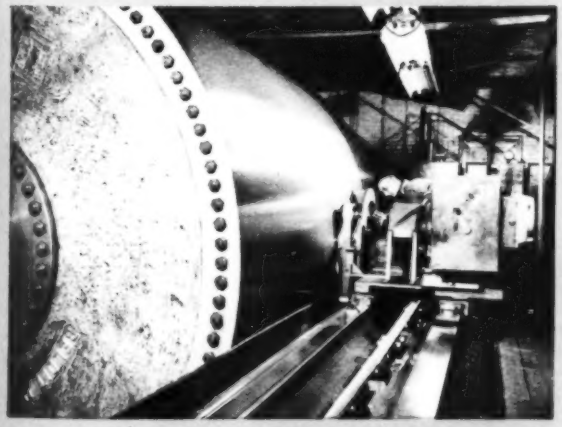
BETAMETER in Beloit's research and development department, operated by J. F. Atkins, measures variation in basis weight of sheet samples taken from Beloit machines running in the field. Testing of this type is only one phase of Beloit's never-ending design development.



READY TO ROLL: E. Lindberg *(center)*, master mechanic, and J. Rouman *(right)*, chief engineer, Combined Locks Paper Co., are shown by R. R. Olson, chief of Beloit's service department, how dryers are tested and loaded on flat cars for safe delivery to the mill. (See next page.)



FAST FOOTWORK and skill on the part of machine tenders is required in the eagle-eye process of starting up. Above, operators are shown "passing the tail" from dryer section into the calender of the new Beloit 252" Fourdrinier Board Machine at Rome Kraft Co., Rome, Ga.



PRECISION PLUS: B. R. Martin's years of experience have made him a versatile grinder operator. Not only does he operate the Yankee dryer grinder at Beloit, but he is a familiar figure in Beloit customers' mills, doing grinding work on all types of rolls and dryers.

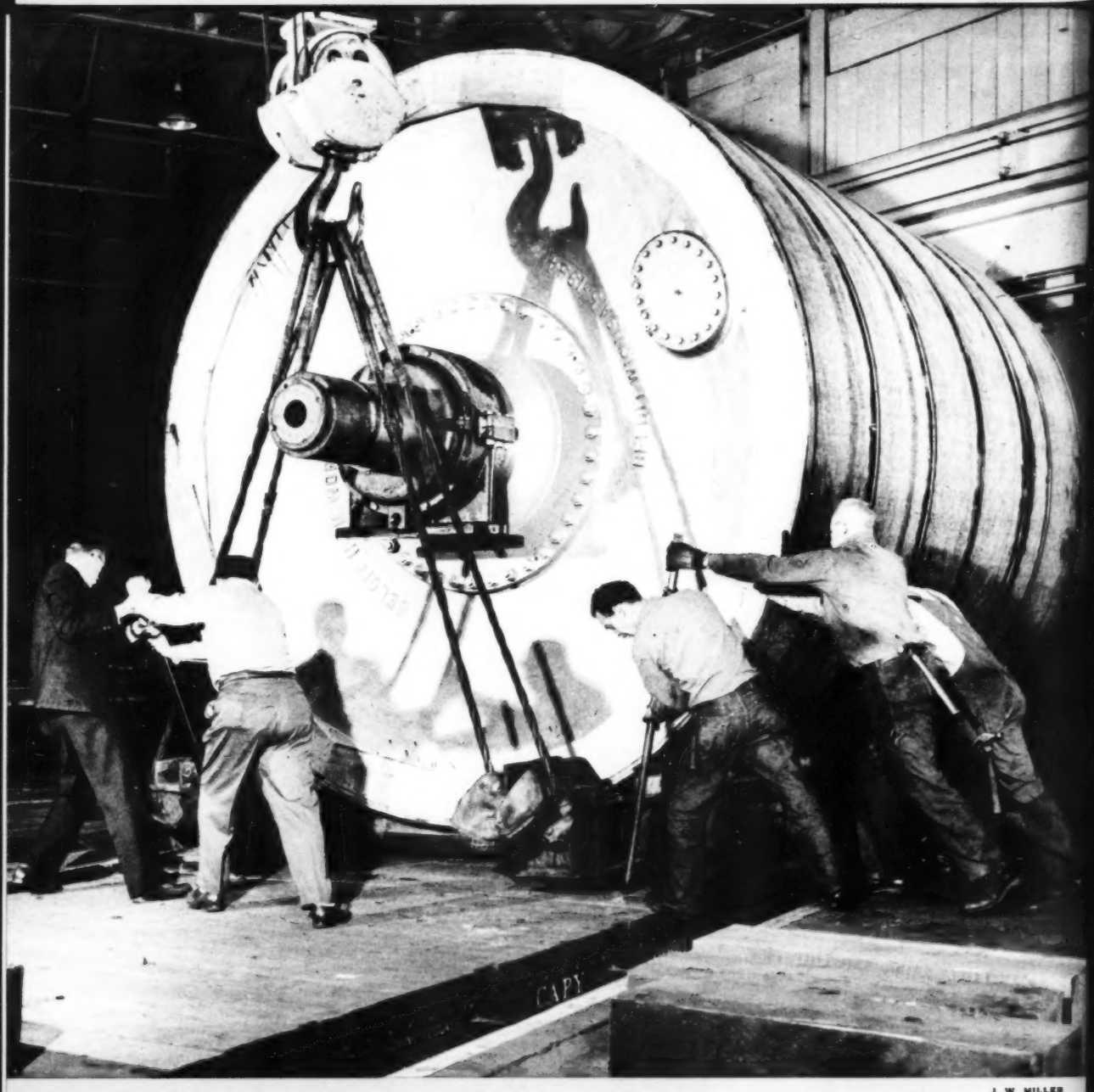
your partner in papermaking

BELOIT

PAPER MACHINERY

BELOIT IRON WORKS · PAPER MACHINERY · BELOIT, WIS., U.S.A.

WHEN YOU BUY BELOIT . . . YOU BUY MORE THAN A MACHINE



J. W. MILLER

IT'S A BIG JOB, loading a Yankee dryer, but Beloit's shipping department has yet to be baffled by a behemoth. A 12-foot Yankee like the one above has a total weight of 92,000 pounds and must be placed on a flat car with exacting care. A 75-ton bridge crane lifts the huge cylinder from the adjacent Yankee dryer grinder and places it in line on the car. The dryer is then moved inch by inch until it is centered and balanced. Heavy steel bands are passed over the shell and journals and bolted down to prevent forward or lateral movement. Each time a Yankee is shipped, special arrangements must be made with the railroads, since a Yankee dryer loaded on a car measures 16'-5" from rail to clearance and is over 12 feet wide. Each Yankee must be specially routed to avoid any obstructions along the right-of-way.

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WHEN YOU BUY BELOIT . . . YOU BUY MORE THAN A MACHINE

CURRENT COMMENTS

Good Business and the Fear of Strikes . . . and Paper Prosperity

Economists who entered 1955 anticipating six months of prosperity in business circles before a consumption slow-up are raising their sights. Some believe that the present high commercial and industrial activity may continue until the end of the year.

The only cloud on the horizon is the fear of strikes resulting from the union campaign for a guaranteed annual wage. Meantime, early 1955 dividends paint a picture of prosperity for some time to come.

Big business, however, is not taking any chances, and there is a somewhat hidden — but definite — attitude that anticipates a real battle. Some companies are going so far as to expedite their contracts for anticipated needs by at least a month. The firm with a normal need for an "X" quantity of equipment in August is placing its orders for July delivery. The reason? The advanced contract provides the strike-threatened manufacturer a backlog on which he will be better able to meet the exigencies of a forced shut-down. Meantime, he is protecting his own firm against threatened labor trouble at home.

Mutual self-help

In pursuance of this policy of mutual self-help, one large company is canvassing its suppliers to ascertain the dates on which their labor contracts end. Based on this, the purchasing company anticipates its needs by calling for production and deliveries ahead of the contract cancellation date.

The "fly in the ointment" is that the demands for accelerated deliveries are tending to overload the production facilities of the supplying firms. To what extent the extraordinary output of automobiles and steel products is due to this mutual back-scratching is difficult to determine. It is undoubtedly partly to blame.

Wall Street aristocrats

Paper mill securities, which not so long ago were classified in the cat-and-dog investment category, are becoming the aristocrats of Wall Street. The extent to which the basic paper mill stocks have achieved a blue chip status is shown by the following figures (as of the middle of May): Out of a dozen best known paper mill securities, only four show a yield percentage at current quotations of better than 4 per cent, and the highest interest rate of the group is only 4.6 per cent. Not one of these issues shows an earning ratio of less than 10 times the dividend rate.

Rayonier overseas

A most illuminating example of the change in market conditions was the decision of a group of Rayonier Inc. directors to attend as a body the recent Paris convention of rayon manufacturers. The purpose of the mass "excursion" was to convince foreign rayon fiber manufacturers that Rayonier will continue to serve them as a source of supply for dissolving pulp.

This is a far cry from conditions of a few short years ago, when United States paper mills were largely dependent on Scandinavian pulp for raw material. By 1954 this condition had changed so rapidly that the U. S. had become a pulp-exporting nation. Scandinavian manufacturers were forced to find other markets for their production.

That the decision of the Rayonier board to attend the Paris meeting was not mere sales propaganda was shown May 10, when a regular meeting of directors was held in the French city. At the gathering it was decided to construct a pulp mill at a cost of approximately $30,000,000. According to plan, the new mill is to be in production within two years, but the location has not been determined. However, it was hinted that timber availability may dictate the choice of southeastern U. S.

This is merely an example of the paper industry's current prosperity. Paper and paperboard production for the first quarter of 1955 reached a record total of 7,180,000 tons, 10 per cent higher than a year ago and 2 per cent higher than any previous three-month output. Even if the production pace is slowed, this three-month total will put the industry well on the way toward a new high-record year.

Contracts awarded by the United States Government Printing Office recently made public a definite price upturn over quotations for the last previous allocations. Despite the heavy production, the demand is such that mills are stiffening their price schedules. Even so, they are finding that their backlogs are increasing slowly but surely.

Financial Reports

Paper mill securities continued to show strength through April and early May. Whenever there seems to be a dragging tendency in the stock market, sales fall off. In other words, the sellers are less numerous than the purchasers, and any downward move means an immediate diminution of volume of transactions.

Net Incomes

American Writing Paper Corp.—Net income in the March quarter was $145,581, as against $153,515 for the same quarter a year ago.

Certain-Teed Products Corp.—Net first quarter earnings were $1,606,112, as compared with $771,853 for the same period a year ago.

Container Corp. of America—Net first quarter income was $3,531,000, as compared with $4,255,000 for the like period a year ago.

Dixie Cup Co.—Net first quarter income was $705,683, as compared with $686,405 for the first quarter in 1954.

Doeskin Products Inc.—Net first quarter income was $675,577, as compared with $664,552 for the like period in 1954.

Federal Paper Board Co. Inc.—Net first quarter income was $626,000, as compared with $744,000 for the first quarter of 1954.

Gair Co. Inc., Robert—Net first quarter income was $1,377,041, as against $1,360,974 for the like period a year ago.

Glatfelter Co., P. H.—Net first quarter income was $558,319, as against $360,623 for the same period in 1954.

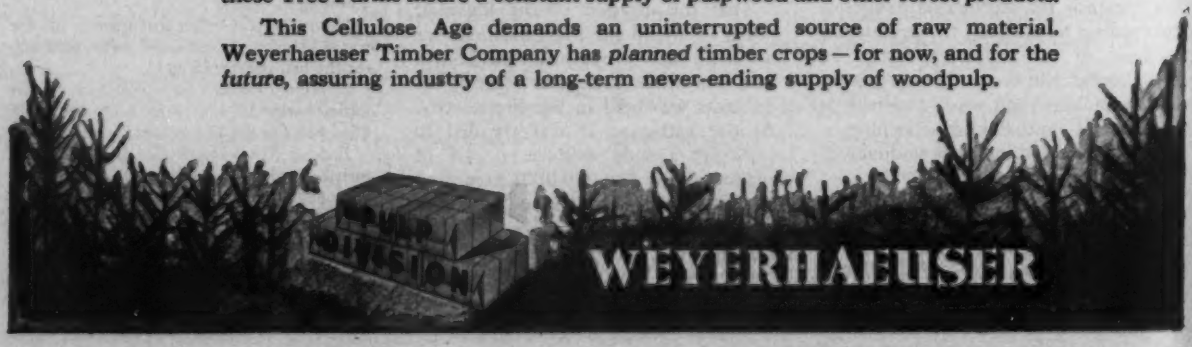
Planning for Posterity...

A Tree Farm is privately owned land dedicated to continuous growth of forest crops for commercial purposes. The words "Tree Farm" indicate that the owner has agreed to manage his forest lands according to sound forestry principles.

Tree Farming, like other forms of crop raising, is a practical business. The Weyerhaeuser Timber Company established the first certified Tree Farm—the Clemons—in 1941 at Montesano, Washington. Thus began a nation-wide movement toward a continuous production of forest crops among private owners of forest lands.

Weyerhaeuser Timber Company today has eleven Tree Farms under *cultivation.* Adequately protected from fire, insects, disease, and destructive grazing, these Tree Farms insure a constant supply of pulpwood and other forest products.

This Cellulose Age demands an uninterrupted source of raw material. Weyerhaeuser Timber Company has *planned* timber crops—for now, and for the *future,* assuring industry of a long-term never-ending supply of woodpulp.



Current comments . . .

Great Northern Paper Co.—Net income for 12 weeks ended March 27 was $1,009,015, as against $1,146,832 for the comparable period a year ago.

Hammermill Paper Co.—First quarter earnings were $515,030, as compared with $381,515 for the first quarter in 1954.

Kalamazoo Vegetable Parchment Co.—Net income for the first quarter of 1955 was $576,728, as against $519,513 for the comparable period a year ago.

Keyes Fibre Co.—Net income for the March quarter was $401,924, compared with $300,723 for the like period in 1954.

Lily-Tulip Cup Corp.—Net income in the first quarter of 1955 was $1,024,674, as against $1,061,447 for the comparable period a year ago.

Mead Corp.—Net income for 12 weeks ended March 20 was $1,780,918, as compared with $1,185,188 for the like period in 1954.

Minnesota & Ontario Paper Co.—Net first quarter income was $1,665,000, as compared with $1,244,077 for the first quarter of 1954.

Stock and Bond Quotations

New York Stock Exchange — Stocks

Closing Prices	May 10, 1955	April 11, 1955
A.P.W.	*4⅞-5	5
Celotex	29⅛	29¾
Same Pref.	19⅛	19½
Certain-Teed.	26	24
Champion P. & F.	52¾	52
Same Pref.	105½	*106-107½
Chesapeake Corp.	*45-46	46
Container Corp.	66⅝	64½
Same Pref.	*101½-104	*102½-104
Continental-Diamond	21¾	21
Crown Zellerbach	75⅛	70¾
Same Pref.	*105½-106	...
Dixie Cup	60½	56½
Eastern Corp.	27	27
Federal Paper Board	34½	36½
Robert Gair	28	29¼
Gaylord Container	38¼	36½
Great Northern	*77-78½	78¾
Hammermill	32¾	30¼
International	100	88¾
Same Pref.	*103-104	105
Kimberly-Clark	50⅛	47¼
MacAndrews & Forbes	*49¾-50⅛	52
Marathon	30⅞	33¼
Masonite	27½	29⅜
Mead Corp.	59½	61⅛
Same Pref.	106	*105-106
Same Sec. Pref.	66½	68
Minnesota & Ontario	61⅛	57¾
National Container	15⅞	15⅞
Same Pref.	27⅞	27¼
Oxford Paper	45⅛	43½
Same Pref.	99½	97¾
Rayonier Inc.	75	76
Same Pref.	*39¼-39⅛	38¼
Rhinelander	34⅜	32
Scott	63	61¾
Same $3.40 Pref.	*95½-96	*96½-97½
Same $4.00 Pref.	*104-105½	*106-107
St. Regis	41½	40⅜
Same Pref.	102	103½
Sutherland	48½	52½
Union Bag & Paper	82½	76
United B. & C.	20	20½
United Wallpaper	2	2⅛
Same Pref.	*17⅛-17⅞	19¾
U.S. Gypsum	260	238
Same Pref.	*180-183½	*180-182¼
W. Va. P. & P.	43½	43
Same Pref.	108¾	*107-108

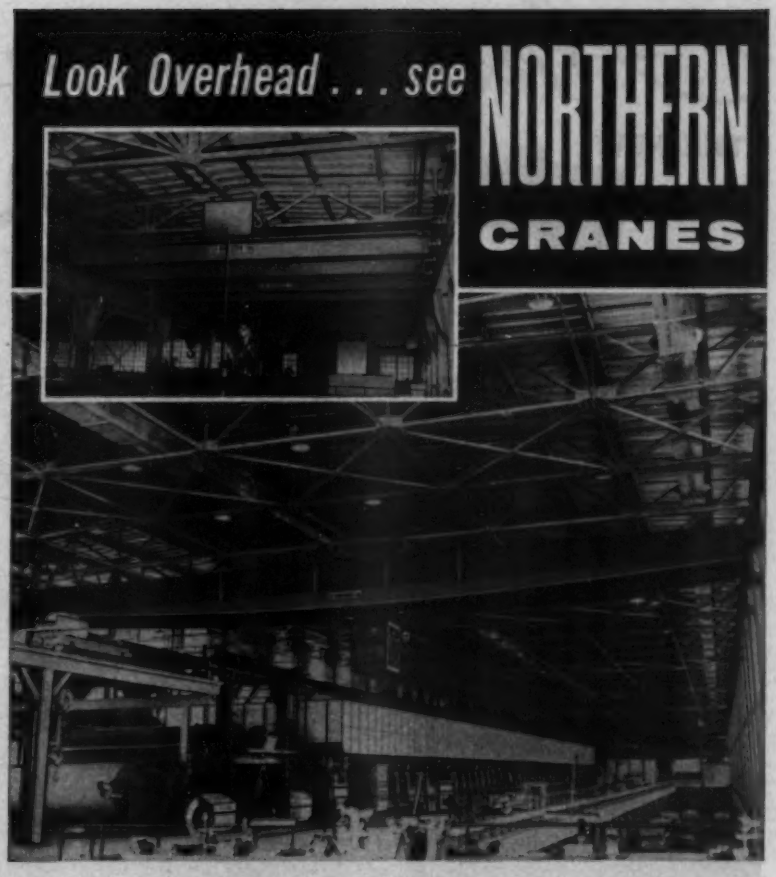
New York Stock Exchange — Bonds

Celotex 3¾%	...	...
Champion P. & F. Co.	...	...
Mead Corp. 2%	...	...

American Stock Exchange — Stocks

American Writing	18½	18½
Brown Co. Common	15⅞	16¼
Same $5 Pref.	112	114¾
Puget Sound	48	...

*Closing Bid and Asked Prices.



selected by leading paper mills

It is frequently said that there is no substitute for experience.

Rome Kraft Company's selection of NORTHERN CRANES for the machine, roll grinding, turbine and refiner rooms in its new plant at Rome, Georgia, reflects Northern's experienced responsibility for over fifty years in delivering the particular overhead materials handling service required in production type paper mills.

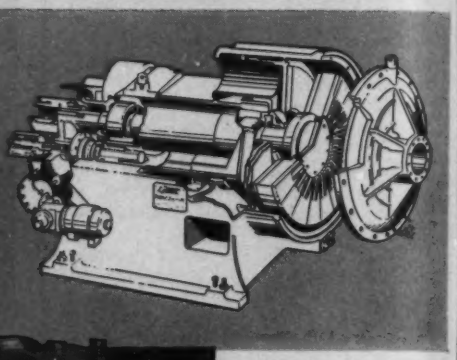
NORTHERN CRANES are fast, safe, dependable; designed and built for minimum maintenance, quick easy accessibility for service, for maximum efficiency of your invested capital.

NORTHERN MATERIALS HANDLING EQUIPMENT

NORTHERN ENGINEERING WORKS
210 CHENE ST., DETROIT 7, MICH.

Announcing

THE NEW DOUBLE-D WITH EQUA-FLO



This simplified drawing illustrates how stock flows around double discs, is kept under constant pressure in longer contact with refining surfaces. Fully automatic or push-button controls.

New—and it will make news in the paper industry! A fully pressurized double disc refiner that produces amazing savings in power, floor space and cost because it does the work of *two* conventional refiners.

New—but proven because full scale production models have been in operation in several leading mills for as long as 18 months.

Performance (on hard-to-work stock), simplicity of operation and ease of maintenance under mill conditions have more than lived up to experimental forecasts. Ask your Jones representative for details or write for Bulletin No. 1083.

Jones

The Paper Industry

JUNE 1955

Two new ways toward greater productivity

IN THIS ISSUE ARE FEATURED two developments which point to new trends in the pulp and paper industry and which are bound to make important contributions to the industry's productivity.

One of these developments is the first and exceedingly successful operation, on a commercial scale, of chemi-groundwood pulp and newsprint production at Great Northern's East Millinocket mill. The pretreatment of hardwood logs with sodium sulfite solution under pressure reduces power requirements for the grinding operation by about 50 per cent. What this means to the economy and the productivity of newsprint manufacture is self-evident.

In this connection, we should also like to draw attention to another development, namely that of making groundwood from chipped wood. The chips, either pretreated or raw, are first passed through pressifiners which leave the chips in a fibrous state with a water content less than that of the growing wood. The power requirements for this process are approximately 900 kw hrs. per ton of groundwood, which is less than 50 per cent of the conventional power requirements for making groundwood.

All these developments pressage increased activity in establishing new newsprint manufacturing facilities in the hardwood areas of the North and Northeast.

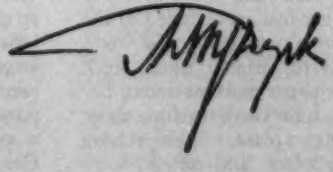
The second development featured in this issue is the advent of the gas-turbine, the application of which in the pulp and paper field is expertly discussed by Frederick Wierk and William L. Garlington of Reynolds, Smith and Hills.

In the March, 1955, issue of THE PAPER INDUSTRY we mentioned the probability of the gas-turbine becoming a major contending factor in the field of power generation in the next 5-10 years. Considering that the electric power consumption in this country doubles every ten years, the place of the gas-turbine in our industrial pattern is destined to be a most impressive one.

The gas-turbine seems to be the ideal answer to a pulp and paper mill faced with a demand for auxiliary power as a result of the addition of essential manufacturing facilities for which no power allowance was made in the original planning of the mill. This applies particularly to many older and smaller mills in the Northeast which are faced with the urgent problem of modernization and expansion.

What makes the gas-turbine especially attractive to the pulp and paper industry is the turbine's 800°F. exhaust, which can be most advantageously applied by the pulp and paper industry — which has an extremely high thermal requirement. As explained by Mr. Wierk, the turbine's exhaust can be used in heating steam boilers or in drying pulp, paper, and lime mud before the latter enters the kiln.

Additional advantages of the gas-turbine are low maintenance, quick start-ups, and simple controls that lend themselves to fully automatic operation.



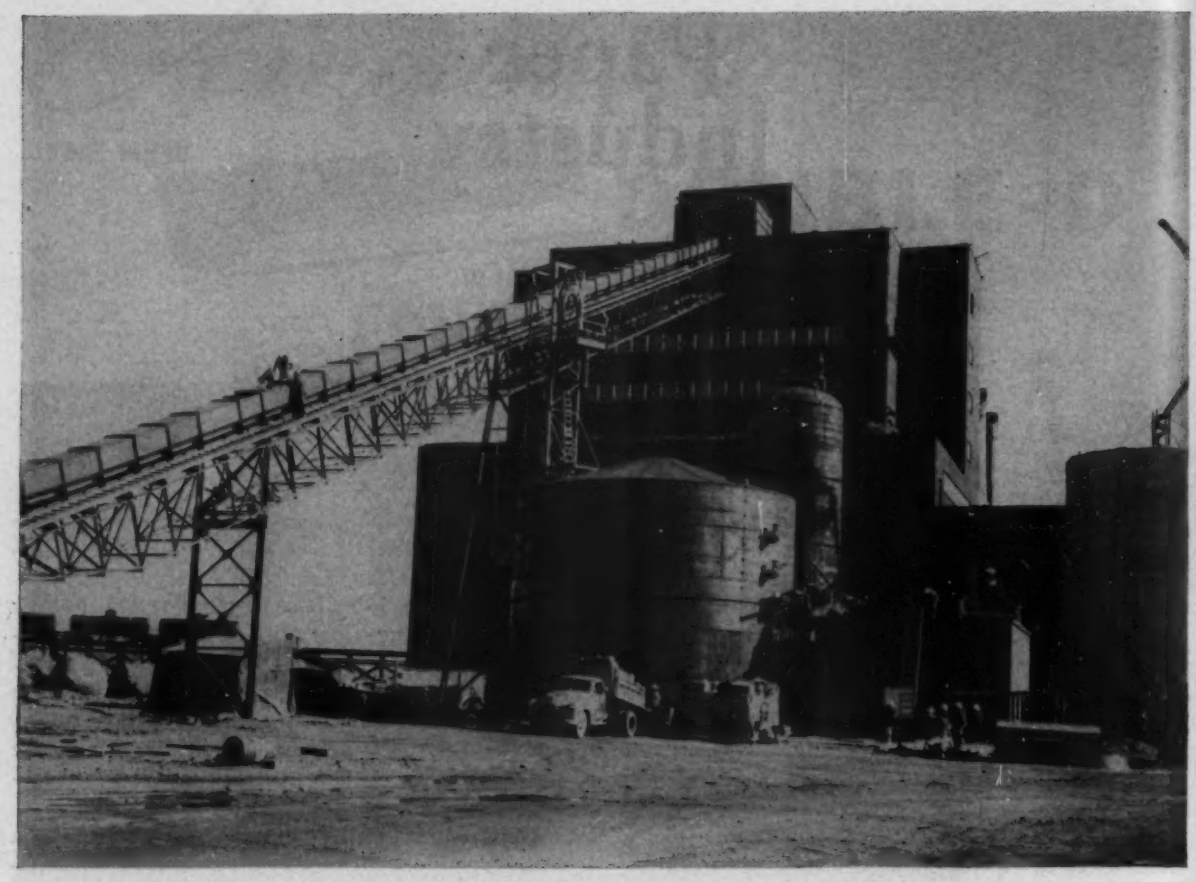


Fig. 1—First U. S. chemi-groundwood newsprint mill

First chemi-groundwood newsprint mill in operation at East Millinocket

THE EXPANSION of Great Northern Paper Co.'s East Millinocket, Maine mill was designed to add 500 tons of daily capacity to the company's current output. The expansion was undertaken in two steps. The first step included construction of the first commercial chemi-groundwood mill of entirely original design, including two digesters capable of treating a minimum of 150 tons of hardwoods per day and a 276-in. paper machine designed for a maximum speed of 2,500 fpm. Other expansions included in the first step were a completely new wood room, woodyard, grinder room, stock screen room, paper machine room, finishing room, train shed, machine shop, filtered water plant, high-pressure steam power plant, and offices.

The second expansion step, which is to be completed later this year, includes the installation of a 290-in. paper machine, four additional digesters in the chemi-groundwood plant, additional grinders, additional screening capacity, an additional high pressure boiler, and other supporting facilities.

The chemi-groundwood process was developed in the laboratories of New York State College of Forestry, Syracuse, and thoroughly tested through a 50-ton-per-day commercial pilot plant at the East Millinocket mill.

Stone & Webster Enginering Corp. acted as general contractors and prepared the design for the high-pressure power plant and the chemi-groundwood pulp mill, in consultation with Great Northern engineers. Design of the other parts of the expansion was handled by Great Northern's Engineering Department.

Wood yard operations

Soft and hard woods are handled separately at the East Millinocket mill. In the woodyard reserved for softwoods, the equipment includes a double-wing traveling stacker which stacks the barked logs in 70-ft. high piles, two belt conveyors "A" and "B", 1240 ft. and 630 ft., respectively, which serve the stacker and the mill grinder room, and a two-strand chain conveyor which feeds the belt conveyor from the woodroom. Conveyor "A" delivers to the double-arm stacker through a traveling tripper. This conveyor is reversible. In addition to handling logs from the wood room, it can

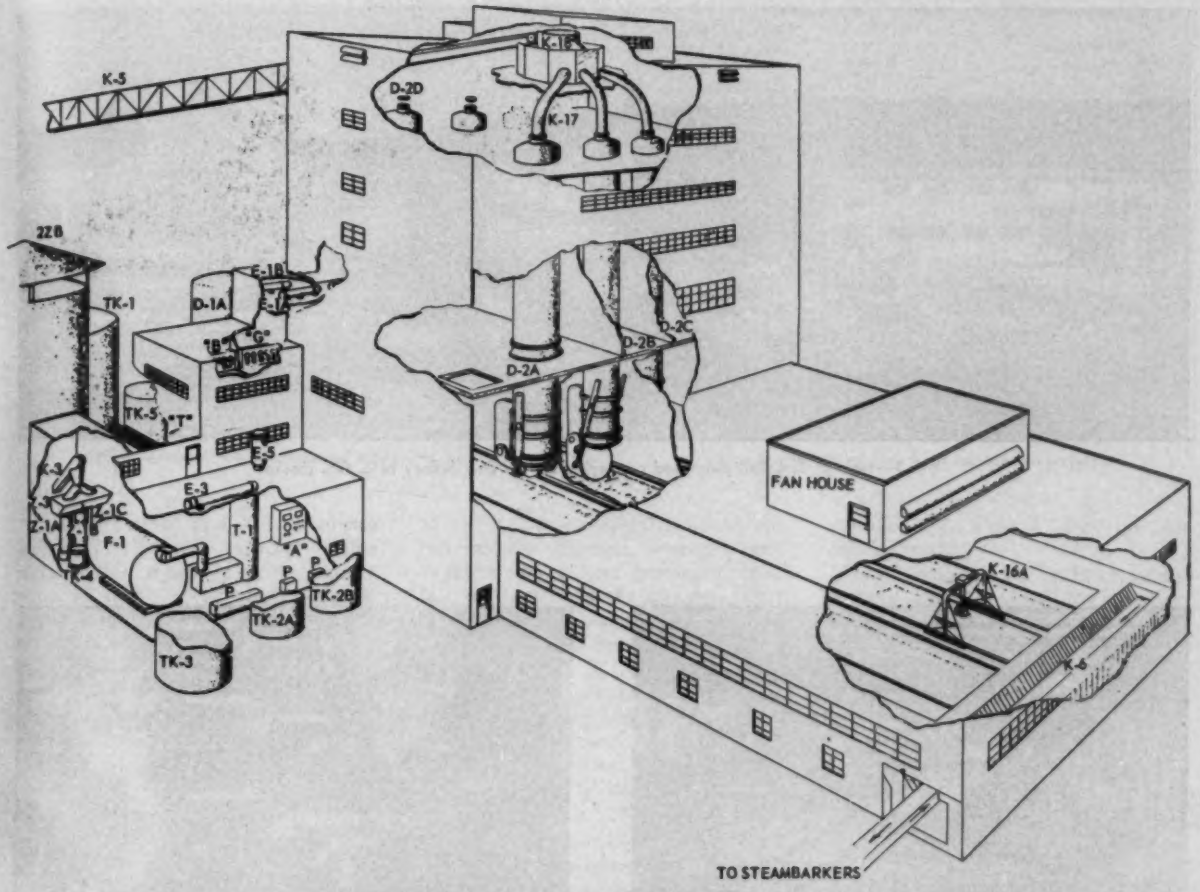


Fig. 2—Layout of digester building. D-1A accumulator; D-2A, B, C, D digesters; E-1A, B cook liquor heaters; E-3 accumulator blowdown condenser; E-5 absorption tower condenser; F-1 sulfur burner; K-3 sulfur melter conveyor; K-5 digester loading conveyor; K-6 cooked wood conveyor; K-16A cooked wood crane & grapple; K-17 log chutes; K-18 log chute turntable; T-1 absorption tower; TK-1 soda ash slurry tank; TK-2A, B sulfiting tanks; TK-3 white liquor storage tank; TK-4 liquid sulfur tank; TK-5 water storage tank; Z-1A, B, C oil sulfur melters; 2ZB sulfur sud; Z-3 sulfur melter hopper; "P" pumps; "T" transformers; "A" motor control panel; "B" white liquor control panel; "G" digester control panel

also deliver logs to conveyor "B" leading to the block storage tanks. Both conveyor belts are 36 in. wide. Logs are fed from the piles by crane and grapple to the portable chain conveyors which feed conveyor "A". The capacity of this woodyard is 70,000 cords held in two piles. The capacity of the conveying system is about 80 cords per hour.

The equipment in the hardwoods section includes a single wing traveling stacker, rated at 50 cords per hour and capable of stacking 4-ft. logs in a 60-ft. high pile. In addition, there are a 900-ft. cable and button car unloading conveyor, a 150-ft. two-chain transfer conveyor, and a 416-ft. single-chain digester feed conveyor.

Wood room

The wood room houses two barking drums, one of which is a welded drum of two sections, 12 ft. in diameter and 45 ft. long, and the other is a solid shell riveted drum of four sections, 10 ft. in diameter and 44 ft. long.

Logs are hauled up from the river by an eight-strand chain conveyor to a 54-in. flat rubber belt conveyor which feeds the drums.

A single-strand chain conveyor recycles incompletely barked logs to the drums. Provision is made for the installation of a third drum which can handle either softwood or hardwood.

A 2,000-gpm vertical turbine type pump supplies water to the wood room.

Liquor preparation

Soda ash is unloaded and slurried by a pneumatic unloading and slurrying system which eliminates the need for dust separators, bag filters, and pug mill and results in approximately 60 per cent gain in storage capacity.

Air is admitted through ports of a patented unloading hopper attachment to fluidize the soda ash and carry it through a flexible hose and vertical line to the top of the slurrifier, as shown in Fig. 9.

Recycle liquor (saturated soda ash solution) is drawn from the tank and pumped to the nozzle of the slurrifier. Here the liquor forms a curtain through which the air and soda ash stream must pass. This curtain of liquor scrubs the ash from the air stream and washes the material down the tail pipe into the tank. The air stream passes through the vacuum line to the vacuum pump where it is discharged.

The unloading and slurrying system at East Millinocket operates at the rate of 18 tons of soda ash per hour. The storage tank, 34 ft. high and 40 ft. in diameter, holds more than 1,200 tons of soda ash in slurry form.

The soda ash slurry can be pumped to one of the two 12-by 13-ft., 10,000-gal. capacity sulfiting tanks and diluted to the 1.8-lb.-per-gal. concentration.

Fig. 3—View of Link-Belt pulpwood conveying system and Jeffrey Mfg. Co. stacker

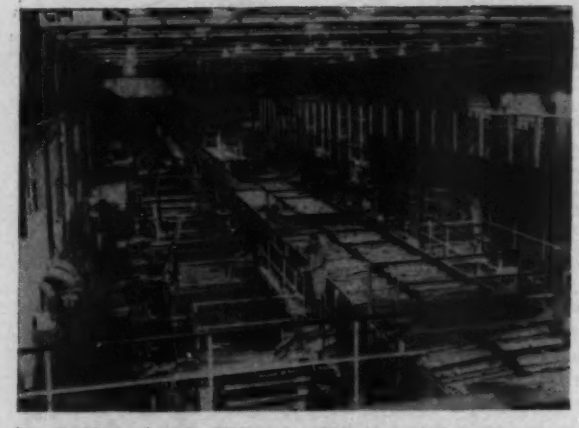


Fig. 4—View of eight Waterous grinders supplied by Montague Machine Co.

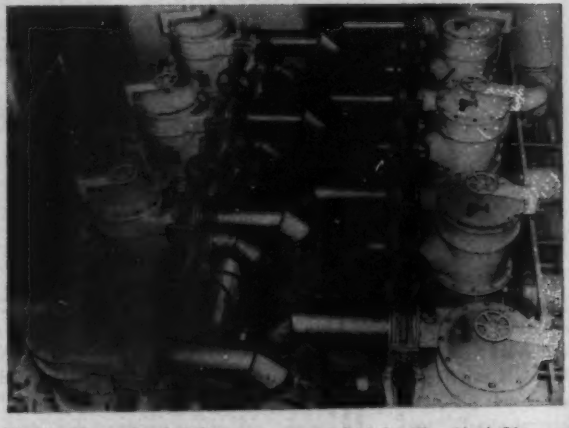


Fig. 5—View of selectifier screens supplied by The Black-Clawson Company

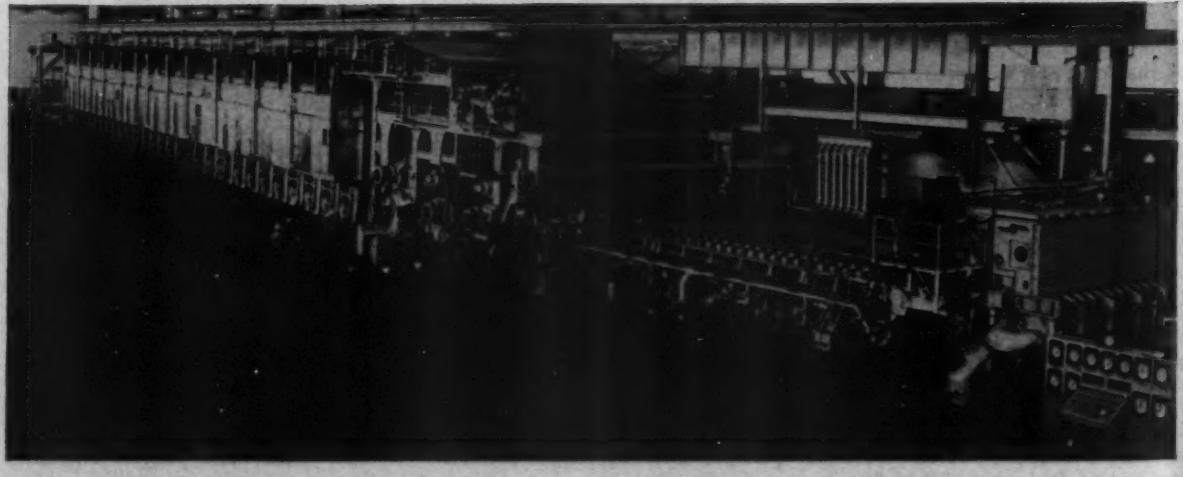


Fig. 6—New Beloit 276-in. newsprint machine designed for a speed of 2500 fpm, with Ross totally-enclosed hood

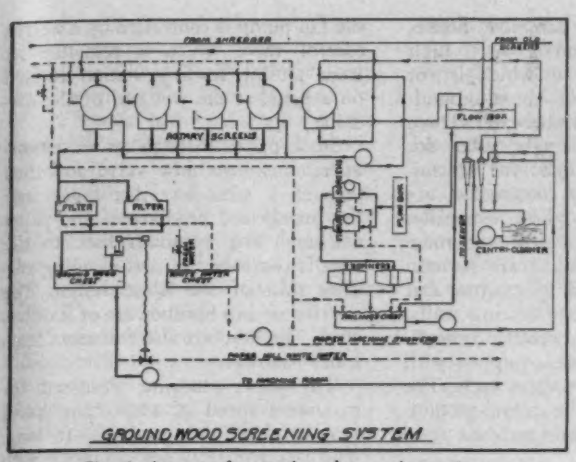


Fig. 7—Layout of groundwood screening system

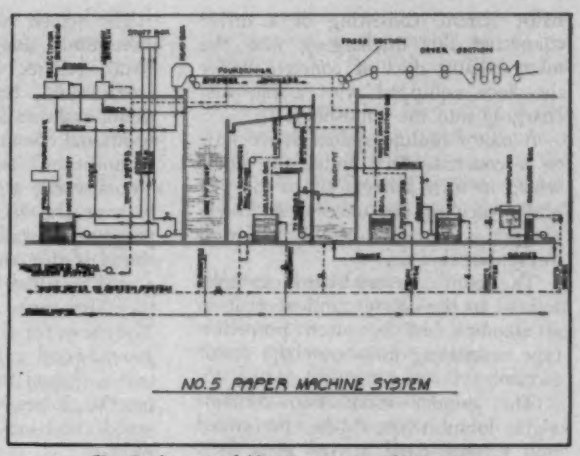


Fig. 8—Layout of No. 5 paper machine system

Sulfur is stored in a 30-ft. diameter by 56-ft., 900-ton capacity, sulfur storage silo equipped with transite windows at two levels, which can pivot out to break the effect of any possible explosion. Sulfur is discharged from the silo through six stainless steel tapered screw feeders operating in concrete troughs and delivering to a collector screw.

Sulfur is conveyed to two melters and then to molten storage tanks. A steam turbine driven pump feeds it to a spray-type 22,800-lb.-per-day capacity sulfur burner.

Sulfur dioxide then enters the bottom of a 3½-ft. diameter by 13-ft. absorption tower where it reacts with a spray of soda ash solution to form sodium sulfite liquor.

Chemi-groundwood plant

The digester plant features two 10½-ft. diameter by 60-ft. steel vertical digesters with full size flat bottom hinged door, the operation of which is controlled by hydraulic lifting cylinders and cylinder actuated bolts. Each of the digesters has a capacity of 25 cords per eight-hour cycle, or a total of 75 cords per day.

Logs fall into the 4-ft. diameter digester opening from a conveyor chute. To absorb the impact of the falling bolts, the digesters are more than half-filled with water. As the digester is filled with 4-ft. hardwood logs, water is progressively drained by gravity from the digesters through motor-operated valves to a water storage tank. When the digester is completely filled with logs and the cover is bolted on, 27-in. vacuum is applied to remove air and facilitate liquor penetration into the logs. Cooking liquor is then admitted from the liquor accumulator, without breaking the vacuum.

During cooking, at 150 psi and 265 to 310°F, liquor is circulated from the top of the digester through twin strainers and a heat exchanger, back into the bottom of the digesters. Four hydraulic accumulators per digester assist in holding the pressure during cooking time.

The liquor preparation and the cooking cycle are controlled from a graphic control panel.

At the completion of the cooking cycle, pressure is released to about 75 psi, the main 10-in. blow valve is opened, and the liquor blown back into the liquor accumulator. The ejection of liquor into the accumulator is completed by applying steam pressure to the digester.

After the cooking liquor is blown, the locking ring is activated by remote control, disengaging the 42 bolts holding the flat bottom hinged door in place. The 50-ton door then swings open and the cooked logs are plunged into a 20-ft. deep pit containing water.

The logs are picked up by crane and grapple and delivered to a single-strand conveyor, which either feeds into a stream barker or by-passes it to discharge to double-strand and chain conveyors feeding the grinder room.

Grinder room

The grinder room houses eight 67- by 54-in. grinders arranged in pairs. Each pair is driven by a 6,000-hp motor. Six of these grinders, each rated at 40 tons, daily capacity, are used for grinding softwood; and the other two, each rated at 75 tons daily capacity are used for grinding pretreated hardwoods. Hardwood is fed to the grinders by a dual, single-strand chain conveyor.

Softwood is fed to the grinders from block tanks of 150-cord capacity through a water trough conveyor.

Each grinder has an individual ex-

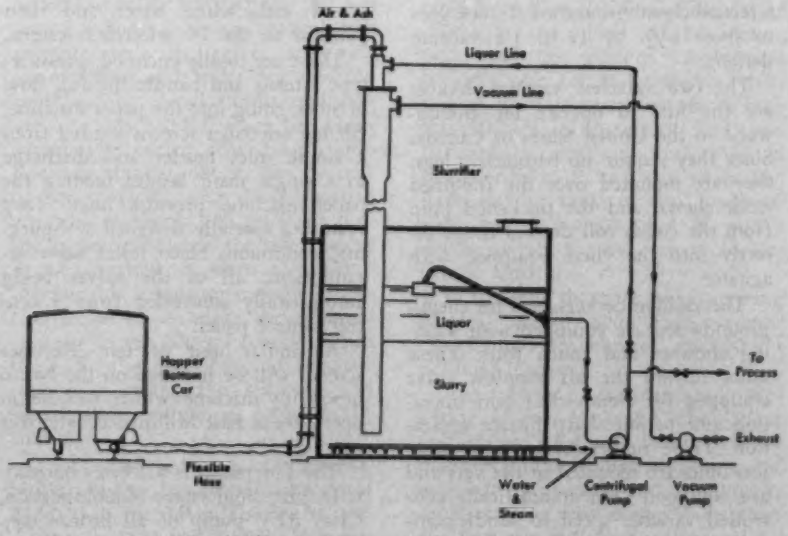


Fig. 9—Sketch of Diamond Alkali slurrying system

haust system, consisting of a direct connected fan discharging into the main exhaust duct of concrete under the floor equipped with a fan discharging into the atmosphere.

A motor cooling system delivers air to a concrete duct under the floor, which in turn delivers air to the pits under each of the motors. A louvre damper is mounted in the side wall to regulate this air.

The room is heated by diffuser units located in the trusses, and ventilation is accomplished by seven propeller-type ventilating units over the motor section.

The grinder room also contains eight Johnson-type ⅛-in. perforated bull screens rated at 100 tons daily capacity. Four of the screens are used on softwood and the other four on hardwood pulps.

Bull screen rejects are passed to three 36- by 24-in. Type "A" shredders en route to three double-disk refiners in the screen room. These shredders operate on a hammers-and-perforated-plates system instead of hammers and a bar screen.

Screen room

All stock is passed through cleaners (centri-cleaners). Accepted stock is screened through eight Cowan rotary lithcoted screens. Five of these are on groundwood and three on chemi-groundwood. Rejects are dewatered on three 4- by 9-ft. single-deck vibrating screens prior to being fed to three double-disk reject refiners. Each screen has a capacity of 20 tons per day and dewaters rejects from 0.6 to 6 per cent consistency. The screened groundwood passes over two 11½-ft. diameter by 20-ft. all stainless, valveless vacuum deckers rated at approximately 110 tons daily capacity, while the screened chemi-groundwood stock goes to three 9½- by 12-ft. J-5 vacuum deckers.

The two valveless vacuum deckers are the first to operate on groundwood in the United States or Canada. Since they require no barometric legs, they are mounted over the tile-lined stock chests, and the thickened pulp from the couch roll doctors drops directly into the chest equipped with agitator.

The vacuum deckers used for chemi-groundwood are equipped with washing showers and couch rolls. These units feature the all stainless valve equipped for cloudy-clear port operation and permit sharp filtrate separation. These rubber-covered and stainless units are mounted in tile vats and are equipped with automatically controlled variable speed to handle variable flow conditions.

The screen room basement houses three 80-ft. long and 17¼-ft. high Semtile chests, one of which is for groundwood, one for chemi-groundwood, and one for white water. Three additional Semtile chests, two for groundwood and one for chemi-groundwood, already constructed, are part of the second phase expansion program. A unique feature of these chests is that their walls are so integrated with the building structure that they also serve as load-bearing walls. The chests for groundwood and chemi-groundwood pulps are equipped with two L-shaped mid-feathers each. The interior joints of the chemi-groundwood chest are of acid-resistant resin mortar.

Machine room

Chemi-groundwood, groundwood, and sulfite pulps are blended in a stock proportioning system prior to entering the 43- by 17- by 16-ft. Semplate-lined machine chest, equipped with L-shaped mid-feather and radial fins. The proportioning system includes three pneumatic transmitting Ratosleeve meters which measure the three types of pulp. Three recording ratio controllers monitor the system by controlling one 6-in., one 4-in., and one butterfly valve. The present ratio in which these pulps are used is approximately 60 per cent groundwood, 30 per cent chemi-groundwood, and 10 per cent sulfite.

The blended stock flows to a tile-lined machine chest, equipped with a 60-in. single horizontal channel-type shockless agitator. It is then pumped by a 78-ft. head, 100-hp, 2,830-gpm capacity pump to a stainless steel stuff box. From here it goes through a valve regulator to a 107-ft. head, 25,000-gpm, 800-hp, pump, where it is mixed with white water and then pumped to the 10 selectifier screens.

These are totally enclosed, pressure-type screens and handle the full flow of stock going into the paper machine. All ten selectifier screens are fed from a single inlet header and discharge to a single main header feeding the paper machine pressure inlet. They feature a specially designed self-purging, continuous bleed reject valve arrangement, all of the valves being automatically controlled from a central control panel.

A similar unit of ten selectifier screens will be installed on the No. 6 newsprint machine which will be in operation at East Millinocket later this year.

The fan pump is a 24-in., horizontally-split, single-stage, double-suction, Class ALV pump of all bronze construction. The stock volume going to the fan pump is controlled by a weight control valve which is remotely set from an air loading station located on a panel at the wet end of the machine.

Stock passes through an air motor-operated stream flow valve and then through a cross-flow distributor into the pressurized headbox of the paper machine. The approach flow to the slice is controlled by self-cleaning rectifier rolls of the latest design. The distributor and headbox are of stainless steel. The headbox also features "foam killer" showers.

The paper machine, designed for maximum speed of 2500 fpm, has a wire 276-in. wide and 137-ft long. The fourdrinier is not equipped with a shake mechanism, but features oscillating suction boxes. All table rolls are dynamically balanced and covered with hard rubber. The entire fourdrinier is removable as a unit, including all table rolls, inside wire rolls, savealls, and suction boxes.

Two pumps, one single-stage and one compound, create 10 to 20 in. vacuum in the couch roll of No. 5 machine. An automatic suction transfer roll makes possible the high speed transfer of the sheet from the fourdrinier into the press section. The sheet is then passed through a transfer press and then through a suction second press.

The inverse third suction press features the air bleed principle and reduces wire mark and "two sidedness."

The dryer section consists of three sections of 18 dryer rolls each. In addition, there are eight Feeney dryers and six felt dryers. All dryers are provided with high-speed condensate removers and duplex steam fits.

The system for automatic temperature control and condensate drainage represents a novel application since it operates on a completely hooded dryer section designed for a high-speed production rate. A much more exacting temperature control is therefore required. The dryer section is basically divided into three pressure groups, with provision for separate control of the felt dryers.

The calender is designed for nine 18-in. diameter rolls and one 40-in. diameter King roll, all mounted in anti-friction bearings. The calender is equipped with a tension indicator and a slack take-up.

A heavy-duty reel, equipped with slack take-up and designed to wind a roll equal to three 40-in. winder sets, insures a roll of newsprint of constant roll hardness in both starting and secondary positions.

The Model "L" 5,000-fpm winder is equipped with motor driven roll

ejectors, slitters, and rider roll. These features, coupled with automatic shaft pullers, overhead shaft transfer, and roll lowering table, are designed to reduce manual handling to a minimum and result in tightly started rolls which are free from "starring" and "interweaving".

The machine is driven by a steam turbine through a machine floor lineshaft connecting the various differential gear units located along the drive aisle. The entire dry end is serviced by a central lubrication system. In addition, each differential drive unit has its own sump oil pump to insure continuous and positive lubrication.

All clutches are of the latest multiple-disk air-operated type, with all operating controls located at the "tending side" of the machine.

An 18-ft. diameter hydrapulper is installed under the dry end of No. 5 machine which continuously handles all machine broke. A similar Hydrapulper will be used with the No. 6 machine.

Machine hood and ventilation

The dryer section of the machine is completely enclosed with an insulated hood which is equipped with horizontal sliding panels in the back and vertical lifting panels in the front. The front panels are arranged for automatic lifting when electric eyes detect a break at the wet end or at the sectional draws. The lifting panels are arranged in four sections and may be raised either individually or collectively.

The ventilating system includes five units, each of which has an exhaust fan, stainless steel economizers, and eliminator plates — all arranged for water heating. There are also five supply fans, with auxiliary heating coils automatically controlled from a console on the machine room floor. This console also controls face dampers, by-pass dampers, and recirculation dampers on the various units.

Three of the supply systems deliver air to the dryer felt, and two of the supply systems deliver air for the internal heating of the machine room.

The machine is also equipped with a Ross-Grewin system, trim conveying system, and a high-pressure calender cooling system, the valves of which are controlled at the reel.

The finishing room

Paper rolls are ejected from the winder to a stripping conveyor where the shafts are extracted from the rolls. The rolls then pass to a push button equipped steel sorting deck. Here the rolls, selected for finishing, are transferred to an automatic belt conveyor which conveys them to the roll finishing line in the finishing room. Here they are delivered to powered wrapping rolls, which rotate as the wrapper is fed automatically from an overhead dispenser. End bands and heads are mechanically applied.

The finished rolls are conveyed over scales for weighing, then to an inclined ramp where they are automatically fed into a lowerator which lowers them to the train shed.

Power plant

The two new power boilers, one of which is now in operation, are the C-E vertical-unit boilers, Type VU-50, with two-stage superheaters and regenerative-type air heaters. Each of these units is designed to produce, at minimum continuous capacity, 300,000 lb. of steam per hour at 1250 psi and 850° F. They are equipped for oil burning but are so arranged as to permit the installation of pulverized coal burning equipment, if desired in the future.

In the combustion control system, oil flow and forced drafts in the two boilers are controlled simultaneously and in parallel from steam pressure. A fuel-air ratio controller provides the adjustment of the oil valve position from measured quantities of fuel flow and combustion air flow. The induced draft fan outlet damper is controlled by furnace draft.

A turbine generator rated at 12,500 kw and 1250 psi supplies 200 psi extraction steam for the steam turbine that drives the paper machine and 40 lb. steam pressure used for process steam.

There are also two pressure reducing and desuperheating stations in the boiler house. The larger system has a total capacity of 382,400 lb. per hour, including steam through the pressure reducing valve, atomizing steam valve, and water for desuperheating. The initial steam conditions are 1250 psi, 855°F from the boiler superheater outlet. The final conditions are 200 psi, 480°F. The purpose of this reducing and desuperheating station is to supply 200 psi steam during those times when the new turbine is not operating, or when it is operating but not supplying enough extraction steam to maintain the required pressure in the 200 psi header. When the turbine is furnishing an adequate supply of steam, the reducing and superheating station is automatically shut off.

The second reducing and desuperheating system has a total capacity of 214,070 lb. per hour. The initial conditions are 200 psi, 480°F. This system's purpose is to supply 40 psi steam for process in the event the 40 psi exhaust steam from the turbine is not sufficient.

Seven 2,000 kva and three 1,000 kva transformers are supplying power to all of the 500v motors used by the mill. All transformers are three-phase, 55° temperature rise, and operate at 40 cycles.

Water treatment

The water treatment plant at East Millinocket is probably one of the most modern on this continent. Immediately following the traveling intake trash screens, with ⅜ in. perforations, nine rotary water filters are installed in battery formation to filter out all fine solids. These units are 10-ft. model filters, each with a rotating cylinder 5 ft. in diameter and 10 ft. long. Each of the cylinders is covered with 14 by 88 stainless steel corduroy wire, which is equivalent to approximately 70 to 80 mesh plain weave wire. Each of these nine units has a capacity of 6500 gpm, or a total screening capacity for all nine units of 60,000 gpm. Advantages incorporated in these units are continuous cleaning of the wire mesh, thus insuring a maximum filtering effectiveness at all times.

For boiler water make-up the system includes two accelerator R-clarifiers, each rated at 140 gpm, and three straight side pressure-type filters. The clarifiers are variable rate units and employ slurry recirculation. Coagulation of color and turbidity is accomplished by the addition of alum and activated silica. Caustic soda is employed for pH correction. The influent water to the clarifier first passes through a flash mixing tank where the flow is split equally to the clarifiers. Coagulating chemicals are added at the mixing tank, and this permits employment of only one set of chemical feeder pumps, no matter whether one or both the clarifiers are in service. The clarifier tanks are made of steel, 13½ ft. diameter by 16 ft. and 8 in. deep. The flash mixing tank is also made of steel, has a diameter of 4 ft., and a depth of 18 ft. and has a motor-driven agitator.

In addition, there are two deaerating heaters, one of 600,000-lb.-per-hour capacity and the other of 300,000-lb.-per-hour capacity.

An automatic demineralizer, consisting of two banks of cation-anion units (the cation unit being 6 ft. in diameter and 6 ft. high and the anion unit 6 ft. in diameter and 8 ft. high), supplies water that averages less than one part per million dissolved solids.

Principal equipment and supplies for the East Millinocket mill

Wood and General Yard

Conveyor belts (6), two 54-in., four 36-in. — Goodyear Tire & Rubber Co.
Pulpwood conveyor (1), 415-ft. single-strand incline conveyor, 30 cords/hr. capacity — Link-Belt Co.
Pulpwood conveyors (2), 1240-ft. and 630-ft. belt conveyors, 80 cords/hr. capacity — Link-Belt Co.
Pulpwood stacker (1), 50 cords/hr. capacity, chain conveyor speed 165 fpm — Jeffrey Mfg. Co.

Wood Room

Barking drum (1), welded, two-section, 12-ft. diameter, 45-ft. long — Canadian Ingersoll-Rand Co.
Conveyor (1), log haul-up, eight-strand — Link-Belt Co.
Conveyor drives — Falk Corp.
Motors, 550-volt — General Electric Co.
Motor control center, 600-volt, class 11-350 — Westinghouse Electric Corp.
Pumps (2) class CRVNL, cradle-mounted end suction, single-stage for condensate return — Ingersoll-Rand Co.
Pumps — Fairbanks, Morse & Co.

Chemi-Groundwood Plant and Liquor Preparation

Chemical sulfur burner linings, brick lining for absorption tower and SO_2 gas piping — Chemical Linings Inc.
Cooking liquor heaters — Struthers-Wells Corp.
Cooking liquor twin strainers — Elliott Co.
Cranes (2), pulpwood handling, four-motor, 22¼-ft. span, with 5-ton capacity bucket handling trolleys and ⅞-cord capacity grapples, magnetic crane control — Whiting Corp.
Digesters (2), 10½-ft. diam., 60-ft. high, with hinged door operated by hydraulic cylinders — Bethlehem Steel Co.
Double-strand SS-150 plus chain conveyor — Link-Belt Co.
Evactor air pump (1), No. 44 single-stage high-pressure steam operated — Croll-Reynolds Co. Inc.
Fluid receiver tank — Lithcote Corp.
Fuel oil pumps (2), model 1205-157A, close coupled to special electric motor — Eastern Industries Inc.
Hydro-pneumatic accumulators (8), 10-gal. — Greer Hydraulics Inc.
Instrumentation — Foxboro Co., Mason-Neilan Regulator Co., Minneapolis-Honeywell Regulator Co.
Molten sulfur pump — Chemical Construction Corp.
Pneumatic unloading and slurrying system for soda ash (1), including 40- by 23-ft. steel slurry storage tank and slurrifier — Diamond Alkali Co.
Pre-charge pumps — Worthington Corp.
Pumps, on circulator, pressurizing, condensate return, water booster, soda ash, padding water white liquor, and sulfiting services — Ingersoll-Rand Co.
Single-strand conveyor — Link-Belt Co.
Stream barker pumps — Allis-Chalmers Mfg. Co.
Sulfur storage silo (1), 30-ft. inside diam. and 50 ft. high — Plummer Associates Inc.
Turn head and chute — Link-Belt Co.
Vacuum pump (1), H-8-L-5 two-stage for chemi-groundwood digesters — Nash Engineering Co.
Valve (1), 6-in. stainless steel Nordstrom, multiport valve, Merchrome-coated plug, Limitorque motor-operated — Rockwell Mfg. Co.
Waste gas exhaust fan — Buffalo Forge Co.
White liquor storage tank — General American Transportation Co.

Grinder Room

Bull screens (6), type ⅛-in. perforated, 100 tons/day — Bird Machine Co.
Chemplate linings, spout and chest linings — Chemical Linings Inc.
Chemtile groundwood dewatering screen collection boxes — Chemical Linings Inc.
Crane, three-motor, 80-ft. span, 30-ton capacity, magnetic control actuated by push button — Whiting Corp.
Crane, two-motor, 37-ft. span, with 5-ton electric hoist and motorized trolley — Whiting Corp.
Dewatering screens — Link-Belt Co.
Exhaust systems (8), individual units for each grinder connected with a main exhaust duct — J. O. Ross Engineering Corp.
Great Northern Waterous grinders (8), 67- by 54-in., 40- and 75-ton capacity — Montague Machine Co.
Instrumentation — Foxboro Co.
Motors (6), 6000-hp, unity power factor, 6900-volt, three-phase, 40-cycle synchronous — Westinghouse Electric Corp.
Motors and motor control centers — General Electric Co.
Motor cooling system — J. O. Ross Engineering Corp.
Pumps (4), two 3-3H-14 for the high-pressure grinder and two 5-DM-14 for the low-pressure grinder — Warren Steam Pump Co.
Pumps (2), reject stock — Goulds Pumps Inc.
Pump, white water booster — Ingersoll-Rand Co.
Shredders (3), 36- by 24-in. Type A Semi-Refiners, welded type plates with ⅜ by 1-in holes — Jeffrey Mfg. Co.
Switchgear, 6900-volt for power plant and grinder room — Westinghouse Electric Corp.
Transformers (2), 1800/2400 type CA/FA power transformers, three-phase, 40-cycle 6.9/24.5 kw — Westinghouse Electric Corp.

Screen Room

Agitators (5), 60-in. double horizontal channel type, shockless, adjustable Pitch, for chemi-groundwood stock chests — Improved Machinery Inc.
Agitator — Mixing Equipment Co. Inc.
Chemtile decker and Cowan screen vats — Chemical Linings Inc.
Cleaners (Centri-cleaners) (5), three 623 primary and two 622 secondary — Bauer Bros. Co.
Consistency regulating control valves (30), 3- to 14-in. bronze plug valves — DeZurik Shower Co.
Cowan screens (8), rotary lithcoated — Montague Machine Co.
Double-disk refiners (3), Type 410-1F-40, 40-in. disks — Bauer Bros. Co.
Motor control centers, ac motors — General Electric Co.
pH controller — Minneapolis-Honeywell Regulator Co.
Process instrumentation and panel — Taylor Instrument Cos.
Pumps (8), two on refined tailings to Centri-cleaner, two on Centri-cleaner to secondary Centri-cleaner, two on deckered groundwood to paper machine, two on broke storage to Cowans — Goulds Pumps Inc.
Pumps (3), vertical, single-stage, double-suction, volute type — Ingersoll-Rand Co.
Pumps (9), stock, rejects, bark and shivers — Warren Steam Pump Co.
Screen (1), 4- by 8-ft. single deck "Low-Head," for removing trash from tank water and flumes — Allis-Chalmers Mfg. Co.
Screens (3), 4- by 9-ft. single deck "Low Head," 0.066-in. round holes 20-ton/day capacity for dewatering groundwood pulp rejects — Allis-Chalmers Mfg. Co.
Selectifier screens (10), No. 24-P solid bronze, with self-purging, continuous bleed reject arrangement — Black-Clawson Co.
Stock chests (6), Semtile, some with L-shaped mid-feathers tied into the building structure on load-bearing walls — Stebbins Engineering & Mfg. Co.
Stock valves — Crane Co.
Vacuum deckers (3), 9½- by 12-ft. J-5, with washing showers, couch rolls and stainless valve — Improved Machinery Inc.
Valveless vacuum deckers (2) 11½- by 20-ft. stainless — Improved Machinery Inc.

Paper Machine

Agitator, 58-in. swing diam., six-blade, shockless, for couch broke pit — Improved Machinery Inc.
Agitators (3), 48-in. swing diam., for broke storage chest — Improved Machinery Inc.

Air supply systems (5), three for dryer felt and two for general heating ..... J. O. Ross Engineering Corp.
Basis weight control valve (1), vee-port type ..... DeZurik Shower Co.
Calender (1), equipped with tension indicator and slack take-up ..... Beloit Iron Works
Calender cooling system, high-pressure ..... J. O. Ross Engineering Corp.
Chemtile Licheck pulper vat ..... Chemical Linings Inc.
Crane, five-motor, 101 1/3-ft. span, with 30-ton, capacity trolleys on 60-ton capacity bridge ..... Whiting Corp.
Differential drive gear units, with own individual sump oil pump and with clutches of the multiple disk air-operated type ..... Beloit Iron Works
Dryer temperature control and condensate drainage ..... Ross Midwest Fulton Corp.
Electric paper machine helper drives ..... Westinghouse Electric Corp.
Fan pump, 24-in. horizontally split, single-stage double suction, Class ALV ..... Ingersoll-Rand Co.
Head box, pressure, with cross-flow distributor and self-cleaning rectifier rolls ..... Beloit Iron Works
Hood, Ross-Hooper five-unit type, totally enclosed, with vertically lifting front and horizontally sliding back panels, each unit with exhaust fan, stainless steel economizers and eliminator plates ..... J. O. Ross Engineering Corp.
Hydrapulper (1), 18-ft. diam. to handle broke ..... Black-Clawson Co.
Jonsson reject screen ..... Bird Machine Co.
Lubrication system ..... Bowser Inc.
Machine chest, 43- by 17- by 16-ft., with L-shaped mid-feather and radial fans ..... Stebbins Engineering & Mfg. Co.
Meters (3), pneumatic transmitting Ratosleeve type, for the stock proportioning system ..... Fischer & Porter Co.
Newsprint machine, 276-in., 2500-fpm, 54 dryer rolls ..... Beloit Iron Works
Process instrumentation ..... Taylor Instrument Cos., Foxboro Co.
Pumps (9), one on disintegrator to couch, one on machine chest to stuffbox, one on couch pit to broke storage, one on broke hydrapulper to couch pit, four on hot water, one on seal box to wire pit ..... Goulds Pumps Inc.
Recording ratio controller with 6-in. and 4-in. Ratogate valves ..... Fischer & Porter Co.
Reel, heavy-duty with slack take-up, winds roll equal to three winder sets ..... Beloit Iron Works
Ross-Grewin system ..... J. O. Ross Engineering Corp.
Semplate lining in the wire and couch pits ..... Stebbins Engineering & Mfg. Co.
Steam turbine ..... General Electric Co.
Trim conveyor system ..... J. O. Ross Engineering Corp.
Vacuum pumps (2), H-5 for steam condensate system ..... Nash Engineering Co.
Vacuum pumps (2), one single-stage and one compound for couch rolls ..... Roots-Connersville Blower Co.
Winder, Model "L" type, equipped with motor-driven roll ejectors, slitters and rider roll ..... Beloit Iron Works

Finishing Room

Cranes (2), two-motor, 34-ft. span, wide flange girder Gantry cranes with 15-ton capacity hoists ..... Whiting Corp.
Finishing equipment, complete unit, consisting of wrapping and heading machines, conveying system, lowerator, roll up-ender, scales ..... Lamb-Grays Harbor Co.
Lift trucks (2), 5000-lb., equipped with Bartel devices to handle rolls up to 72 in. ..... Clark Equipment Co.

Power Supply

Boilers (2), 300,000-lb./hr., 1300-psi, 850°F C-E vertical-unit type, with two-stage superheaters and regenerative type air heaters ..... Combustion Engineering Inc.
Combustion control system, fuel-air ratio controller ..... Bailey Meter Co.
Controlled volume pumps ..... Milton Roy Co.
Crane, one-motor, 31-ft. 10-in. span, 20-ton capacity ..... Whiting Corp.
Feed water heaters (2), 4170-sq. ft. ..... Westinghouse Electric Corp.
Fuel oil heaters (2), 1340-sq. ft. 24- by 182-in. ..... Alco Products Inc.
Fuel oil heater, G-fin tank type with cone seat tube joints, 150,000-lb./hr. capacity ..... Griscom-Russell Co.
Induced draft fans and motors (2) ..... Westinghouse Electric Corp.
Pumps (2), No. 4 and No. 3½ screw type, fuel oil transfer and burner service ..... Warren Steam Pump Co. Inc.
Pumps (8), three Class CHTA high-pressure, double-case boiler feed pumps, rated at 750-gpm, 156-psi discharge pressure; three APHC vertical type condensate pumps; two ALV type, horizontally split, double suction, single-stage ..... Ingersoll-Rand Co.
Steam pressure reducing and desuperheating control equipment (2), 382,400-lb./hr. and 214,000-lb./hr. ..... Swartwout Co.
Temperature recording instruments (5), Brown, two 16-point, two 8-point, and one 24-point strip chart ..... Minneapolis-Honeywell Regulator Co.
Turbine generators (2), 12,500-kw, 1250-psi, 855-FTT ..... General Electric Co.
Turbine drives (3), 950-hp C-325 turbines for feed water ..... Westinghouse Electric Corp.

Water Treatment

Automatic demineralizer, two banks of cation-anion units ..... Cochrane Corp.
Chlorinator, series A-586, air-operated, 4000-lb. chlorine/24 hrs. ..... Wallace & Tiernan Co. Inc.
Conductivity recorder, Brown, four-point strip chart potentiometer ..... Minneapolis-Honeywell Regulator Co.
Controlled volume pumps ..... Milton Roy Co.
Deaerating heaters (2), 600,000-lb./hr. and 300,000-lb./hr. capacity ..... Cochrane Corp.
Instruments and panel ..... Foxboro Co.
Motor control center, 600-volt, Class 11-350 ..... Westinghouse Electric Corp.
pH recorders (2), Brown, circular chart potentiometer ..... Minneapolis-Honeywell Regulator Co.
Pumps (7), three VLV type, vertical single-stage, double suction volute pumps; three APM vertical pumps, and one horizontally split, single-stage double suction ALVS type ..... Ingersoll-Rand Co.
Rotary water filters (9), "North" 14 by 88 stainless steel corduroy wire, 6500-gpm capacity ..... Green Bay Foundry & Machine Works
Traveling intake track screen, ⅛-in. mesh, Model 45, 120 in. wide and 14-ft. centers ..... Link-Belt Co.

Miscellaneous

Crane, five-motor, 70-ft. span, with two 30-ton capacity trolleys, magnetic control actuated by push buttons for machine shop ..... Whiting Corp.
Fire pumps (2), 2500-gpm capacity, 125-psi ..... Peerless Pump Div., Food Machinery & Chemical Corp.
Fittings, stainless steel flanged type, 316 E. L. C., for use in grinder, screen and machine rooms ..... Portland Copper & Tank Works Inc.
Grinder, CC-4 circular knife, with built-in set grinding attachment ..... Samuel C. Rogers Co.
Limitorque units (39), five SM-2, three SMA-2, 17 SMA-00, eight SMA-0 and four SMA-1 ..... Philadelphia Gear Works
Pipe hanger assemblies (4500) ..... Carpenter & Paterson Inc.
Pumps (5), centrifugal ..... Pennsylvania Pump & Compression Co.
Structural and reinforcing steel ..... Bancroft & Martin Rolling Mills Co.
Substations (11), Multimeter unit type, five totalling 6000 kva on the paper machines, five totalling 10,000 kva for pulp processing equipment and one 4000-kva unit for the power plant ..... I-T-E Circuit Breaker Co.
Substations (5), 5000-kva self-cooled with provisions for future forced air cooling, two for the screen room, two for the machine room and one for the filter plant ..... Allis-Chalmers Mfg. Co.
Tanks (8), condensate return, fuel oil, service water, two 11,000-gal. storage tanks, 60-in. diam. blow-off tank, oil heater condensate tank ..... Portland Co.
Transite pipe ..... Johns-Manville Products Corp.

The gas turbine

— in southeastern pulp and paper mills*

FREDERICK WIERK† and WILLIAM L. GARLINGTON‡

▶ The gas turbine, in addition to generating electrical energy, delivers an 800°F. exhaust which can be usefully applied among others in (1) heating steam boilers and (2) drying pulp, paper and lime mud

▶ Maintenance on modern gas turbines is surprisingly low, start-ups are fast, and controls are simple and easily amenable to fully automatic operation

IN THE FIELD of power generation, probably no one item has been as quickly and as thoroughly developed as the combustion gas turbine. The purpose of this paper is to explore, in general terms, the possibilities of profitable application of the gas turbine to pulp and paper mills, particularly in the Southeast.

The phenomenal speed with which the gas turbine has been perfected was accelerated by the parallel development, in the aeronautical industry, of both the jet engine and the turbo-prop, in the operation of which some amazing performance and maintenance records have been established. It is beyond our present scope to amplify those data, which may be derived from other literature.

Pulp and paper as an electric power consumer

Among major industries, pulp and paper is led only by the aluminum reduction industry in the amount of electric power required per ton of product. In the Western hemisphere, most of the aluminum reduction industry has been located in Canada solely to be alongside tremendous hydroelectric developments. This location was selected in spite of the fact that their raw materials must come from remote corners of the world, and in spite of the need of tremendous storages dictated by a short navigating season during which those raw materials can be delivered and the aluminum ingots shipped out.

Pulp and paper, however, is most economically produced close to the wood sources which, in this discussion, are the forests of our southeastern states. In a few mills, at what are now considered "small" tonnages, pulp and paper was produced in the Southeast many years ago, but the impressive construction of mills really started in the middle '30's, or about 20 years ago; and today there are 88 mills in our southeastern states producing the staggering amount of about 80,000,000 lb. of cellulosic products per day.

In addition to impressive kilowatt-hour requirements per ton of product, the manufacture of pulp and paper involves large thermal requirements for cooking pulp, drying paper, calcining lime-mud, heating water and air for certain stages in the process, and plant heating. With the exception of lime-mud calcining, these thermal requirements are practically, and economically served by steam at various pressures.

The heat/power balance of pulp and paper mills is such that the largest portion, if not all, of the electric power requirements is most economically generated by the mill itself, with purchased outside parallel power at a minimum which may be zero.

Presently existing facilities

The combination of power and thermal requirements led to the development of the double-extraction-condensing steam turbine generator, which has come to be known as a "paper mill" turbine.

In the southeastern pulp and paper mills, most of these turbines range in capacity from 5,000 to 15,000 kw. Initial pressures run from 450 psi. 700°F up to about 900 psi 850°F. First extraction is somewhere between 150 and 200 psi and second extraction between 50 and 75 psi. Most of these mills are at tidewater or on a fair-sized stream so that vacuum is whatever the water temperature will afford. There are a few cooling towers in use at inland locations.

Many mills need more electric power

As the pulp and paper mills in the Southeast have grown in size, complexity, and scope of their operations, the electric power requirements have increased faster than the thermal requirements which, except for the lime kilns, are satisfied mainly by steam.

The different pulp and paper mills involve a variety of thermal gradients. All of them were probably reasonably well engineered when originally built. Initial and extraction pressures were established by original use requirements and, in some cases, dictated by characteristics of then available equipment. Many of the original installations did involve intelligent consideration, by the engineer, of some envisioned future expansions and changes. Subsequently, and sometimes with very little warning, the sales department would contrive to change the complexion of the business enough to raise "cain" with the heat/power balance, and the operators would go "nutty" trying to keep up with things. A bleach plant might be added. A hydraulic barker would have to come in. Semichemical might be added. Bag plants, box shops, and what have you, were planted on the lot, and these same mills found themselves in more or less distress.

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†Pulp and paper consultant, Reynolds, Smith & Hills, Jacksonville, Fla.

‡Electrical engineer, Reynolds, Smith & Hills.

How the problem was faced

These growing mills, which were adequately engineered when built a few years ago, have secured the needed added electric power from increased condensing power generations, from topping, or from increased purchased power.

Some mills have retained heat/power balances that enabled them to simply expand their power and steam generation horizontally at the originally designed thermal gradients for initial and extraction conditions. Such expansion had little effect on over-all plant efficiencies.

Others have obtained some additional power and improved thermal efficiency by expanding their power and steam generation vertically by adding higher pressure boilers and topping units. They had to acquire a quick education in added problems of high pressure operation, starting with boiler feed-water treatment, and not entirely ending with turbine control gear, nozzles, and blading.

Another group of mills have secured the needed added electric power from increased condensing power generation or from increased purchased power.

Although increased condensing power generation can be obtained at a favorable turbine water rate, it still throws down the creek too many BTUs at a thermal gradient from which little or no recovery can be made. Those mills which simply increased the purchase of outside power did not improve their over-all economy, but they did eliminate increase in fixed capital investment. Under old excess profit taxing, that was probably justified complacence; but it certainly did not enhance the mills' profit.

How the gas turbine fits into this picture

The combustion gas turbine is fed a considerable quantity of air (approximately 90 lb./kwh) and a modicum of fuel, which may be liquid or, preferably, gaseous (approximately 18,000 BTU/kwh). It delivers electrical energy and, most fascinating to pulp and paper mill engineers, a nice hot (approximately 800°F) exhaust discharged at a very useful thermal gradient. This is vividly contrasted with the condensing steam turbine from which an importantly large flood of BTUs is discharged, usually down the creek, at a thermal gradient from which only small recovery may be made. Some mills have a situation where they can use condenser circulating discharge in the mill as process water, and at least one more northerly mill uses it in a woodyard

Discussion by
G. D. Farrar
District Turbine Specialist
General Electric Company

The authors are to be commended upon their selection and coverage of this subject.

As they pointed out, the changing requirements of steam and electric power by the rapidly progressing paper industry create a particularly fertile field for an objective approach such as this.

The gas turbine is old enough to have proved its reliability; for example, gas turbines produced by my company have accumulated over 630,000 operating hours in the field which is equivalent to over 70 machine-years' operation. On the other hand, the gas turbine is still so new that undoubtedly many of its best applications—such as those described by many authors—are still untried.

When the authors refer to boilers, undoubtedly they have in mind bark and recovery as well as power boilers, for any of these can use pre-heated combustion air to advantage.

Another liquid fuel that can be burned in gas turbines is specification modified residual (or Bunker "C") fuel oil. The successful completion of apparatus and methods of its use to modify residual fuel at the point of use to make it suitable for gas turbines has now been developed. This work was done at the Rutland, Vt., gas turbine power station of the Central Vermont Public Service Corp. This station has three 5,000-kw General Electric gas turbines installed. The fuel is treated at the plant by washing to remove sodium and by adding magnesium to inhibit vanadium corrosion. Two different fuels have been successfully modified and used in this manner.

The Rutland system requires part of one man's time to operate and can produce treated oil for a net, including equipment write-off, of 1/3 to ½ cent per gallon. This equipment has been in use since fall of 1953 with satisfactory results.

One year ago, the Union Pacific Railroad had 10 locomotives in operation burning a calcium-treated Bunker "C" which Richfield Oil Co. had prepared to this specification for gas turbine fuel then in use by General Electric. Since then, the number of locomotives in units has been increased to 25. During the past year, these locomotives have burned 15,000,000 gallons of No. 6 oil, and the three turbines at the Rutland plant of the Central Vermont have burned 3,000,000 gallons. A total of about 48,000,000 gallons of residual fuel oil meeting our field specifications has now been burned in our gas turbines.

With the rapid strides that have been made in the development of gas turbine equipment, undoubtedly we will soon see applications such as those described by the authors in pulp and paper mills.

Discussion by
S. Lemezis
General Engineer, Steam Div.
Westinghouse Electric Corp.

The authors have presented a very complete picture of the possibilities which can be realized in applying combustion gas turbines to paper mill service. Rather than attempting to lengthen the list of possibilities, this discussion is confined to amplifying two of the points touched on in the paper.

The "interruptible" clauses in many natural gas fuel contracts need not discourage the use of this ideal fuel in gas turbines; dual-fuel nozzles are available which allow switching from gas to standby liquid fuel and back again on short notice with no effect upon load. The writer's company has had such a system in use on a natural gas pipeline unit for three years. This machine has accumulated some 22,000 hours of operation, with perhaps 10 to 12 hours of operation each month on distillate oil and the remainder on natural gas.

Any studies involving gas turbines burning natural gas should certainly include dual-fuel systems if there is any doubt as to a firm supply of fuel.

The authors' point regarding operation on liquid fuels is certainly well taken.

Mechanically, a combustion gas turbine is very similar to a steam turbine; and parts such as bearings, seals, casings, rotors, lubrication systems, governors and gears require about the same level of inspection and maintenance as those of a steam turbine. Combustor baskets, which are the counterpart of a steam boiler furnace, should be inspected roughly every 500 hours when residual fuel is burned or every 2000 hours on natural gas. Such an inspection, including any necessary replacement of parts, takes about eight hours. It can easily be accomplished during normal planned outages for such work as replacing felts, changing screens or making minor repairs to auxiliary apparatus.

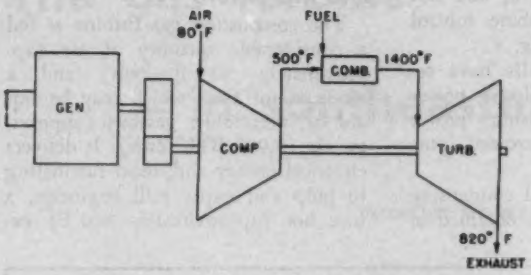

Fig. 1—Gas turbine: simple cycle, single shaft

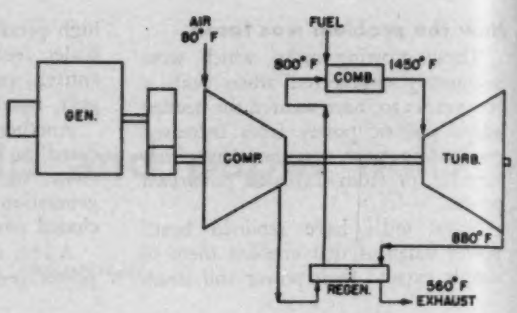

Fig. 2—Gas turbine: regenerative, single shaft

flume in a way which reduces power on the flume circulator pump and also keeps the flume from freezing during idle winter night shifts.

Table 1 presents approximate average data covering gas turbines presently available from different manufacturers. These data are not intended to be precise for any given unit but and paper mill is interested in numerous other things besides kwh *per se*. If, in a given situation, some mill needs kilowatt-hours only, a regenerative double-shaft unit with cascaded compressors will be the obvious answer to cheap electric power increments.

Going back to the simple cycle unit, Fig. 1 shows a single-shaft simple-cycle unit. This is probably the paper mill's first choice because of advantages in using exhaust for purposes other than regeneration in the gas turbine itself.

Fig. 2 shows exhaust used regeneratively in a single-shaft unit. Fig. 3 shows regeneration in a double-shaft

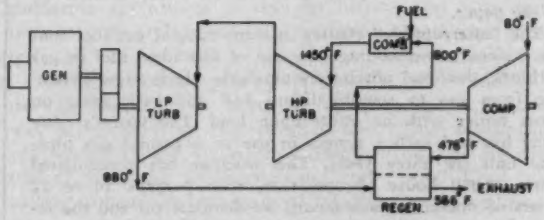

Fig. 3—Gas turbine: regenerative, two-shaft, one-shaft comp.

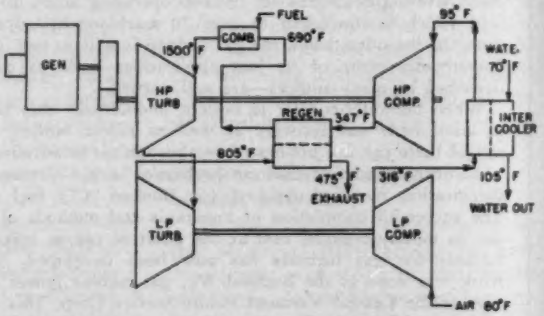

Fig. 4—Gas turbine: regenerative, two-shaft, two-stage comp.

rather to provide food for thought and simply give you a little more than a rough idea of what these units can do. The figures, incidentally, are for simple cycle units and do not show what may be done with regenerative cycles. Our reason for tabulating only simple cycle data in this presentation is that we assume the average pulp

the great variety of possible economic usages of gas turbine exhaust provides the basis from which we can start to evaluate a gas turbine for a given pulp and paper mill situation.

In a pulp and paper mill, gas turbine exhaust may be used in about a dozen different ways, as indicated on the accompanying diagrams.

unit with one compressor on the H.P. shaft. Justification of this extra shaft lies in the difference in shaft speeds, and vane speeds, possible in this arrangement. Fig. 4 shows regeneration in a double-shaft unit, with part of the compression done on each shaft. In larger units the staging of the compression, with intervening inter-

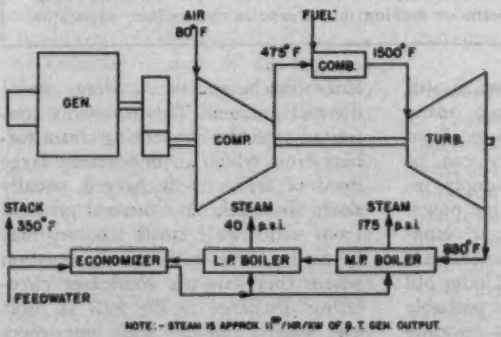

Fig. 5—Gas turbine with non-fired steam boilers

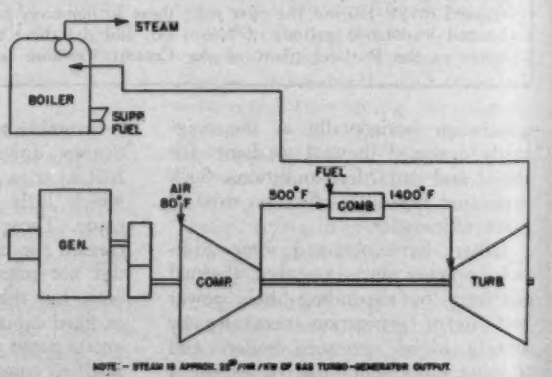

Fig. 6—Gas turbine with supplementary fired boiler

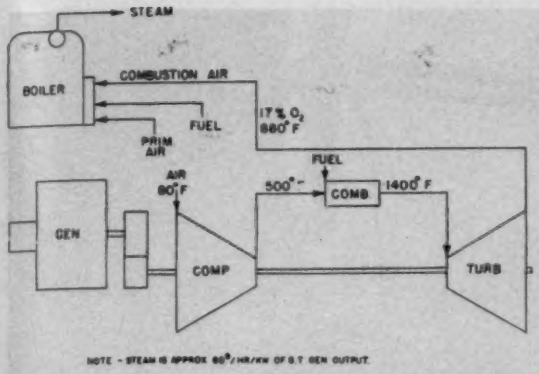

Fig. 7—Gas turbine giving combustion air to fuel-fired boiler

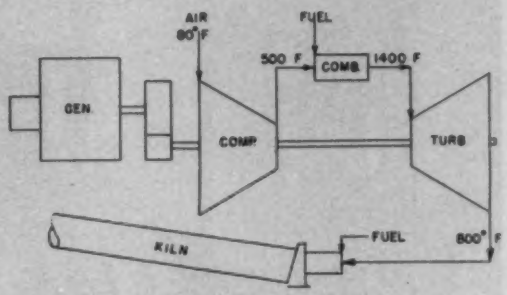

Fig. 8—Gas turbine exhaust as combustion air in kiln

Table I—Typical Data Gas Turbines, Simple Cycle (1955)

A. Range of available capacities	1,250-15,000 kw
B. Fuel intake	18,500-28,000 Btu/kwh
C. Air intake	75-90 lb./kwh
D. Exhaust gas, quantity	81-97 lb./kwh
E. Exhaust gas, temperature	650-850° F.
F. Exhaust gas, thermal energy	14,700-17,500 Btu/kwh
G. Exhaust gas, oxygen content	16-18%

"A" varies among different manufacturers.
"B" to "G" (inclusive): These data vary with ambient temperature, elevation or barometer, percentage of designed load, and other variables.

cooler, justifies the added complexity.

If a mill is rather large, requires only kwh, and, at the same time, is otherwise burning very little prime fuel, any of the regenerative schemes shown in Figs. 2, 3, and 4 may be the most economic source of the needed electric energy. In most cases, this would, however, be questionable since there is almost always enough prime fuel consumed which can be replaced by gas turbine exhaust with a reduction in the cost of the gas turbine installation.

Fig. 5 shows gas turbine exhaust used to directly produce steam in non-fired boilers. This arrangement can produce steam up to 175 psi in one non-fired boiler and, if desired, steam at some lower pressure at the same time in a cascaded arrangement of another non-fired boiler. This may be exceedingly useful if either or both extraction points in the steam plant are up to capacity.

Fig. 6 shows gas turbine exhaust used, as a source of heat, in a supplementary-fired boiler. This arrangement might well be preferred in many mills. The supplementary fuel may be either solid, liquid, or gaseous. The boiler may, in fact, be an existing boiler.

Fig. 7 shows gas turbine exhaust used as a combustion air in a fuel-fired boiler. This eliminates considerable F.D. fan power and will reduce fuel consumption to the extent of the heat in the exhaust gases which, it may be noted, run high enough in oxygen (16 to 18 per cent) to be useful for this purpose. Choice between Fig. 6 and Fig. 7 must be based on careful study of the existing situation.

Fig. 8 shows use of gas turbine exhaust as combustion air in lime kilns. This usage may be applicable to larger mills which run more than one kiln. It will not increase the capacity of the kilns but will cut down the fuel consumption in them. It may be combined with Fig. 10.

Fig. 9 shows gas turbine exhaust, diluted to reduce temperature if the product so demands, used in drying the pulp or board. To the extent of BTUs supplied, this usage will reduce the extraction steam consumed by the driers. This usage is applicable where the driers are equipped with the enclosed type of hood, which has more recently come into use.

Fig. 10 shows gas turbine exhaust used to dry lime-mud kiln-feed. This usage will not only decrease the amount of kiln fuel per ton of lime burned, but will also materially increase the capacity of a given kiln. This may be very important to any mill where the kiln is up to capacity and constitutes a bottleneck. It may be combined with Fig. 8, and either or both of these schemes may be feasible if the added gas turbine can be located near the kiln.

It should be obvious that, in many cases, combinations of a number of the above schemes may be both possible, practical and profitable.

Salient features of a gas turbine installation

First cost of a gas turbine and related combined equipment is less than that of any other combination of previously used equipment which may provide the same combined output.

Gas turbine foundation requirements are simple and inexpensive,

(Continued on page 259)

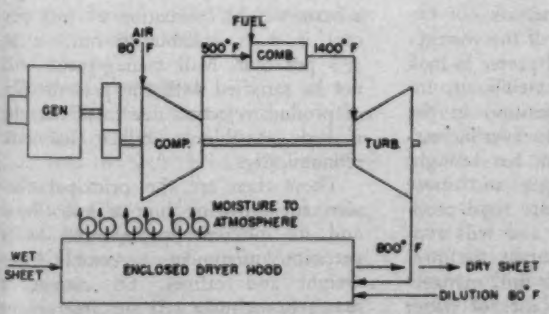

Fig. 9—Gas turbine exhaust drying pulp or paper

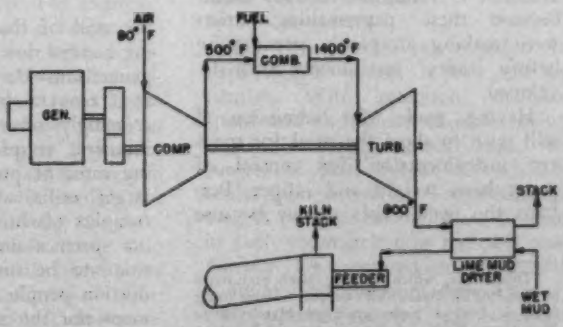

Fig. 10—Gas turbine exhaust to dry lime mud to kiln

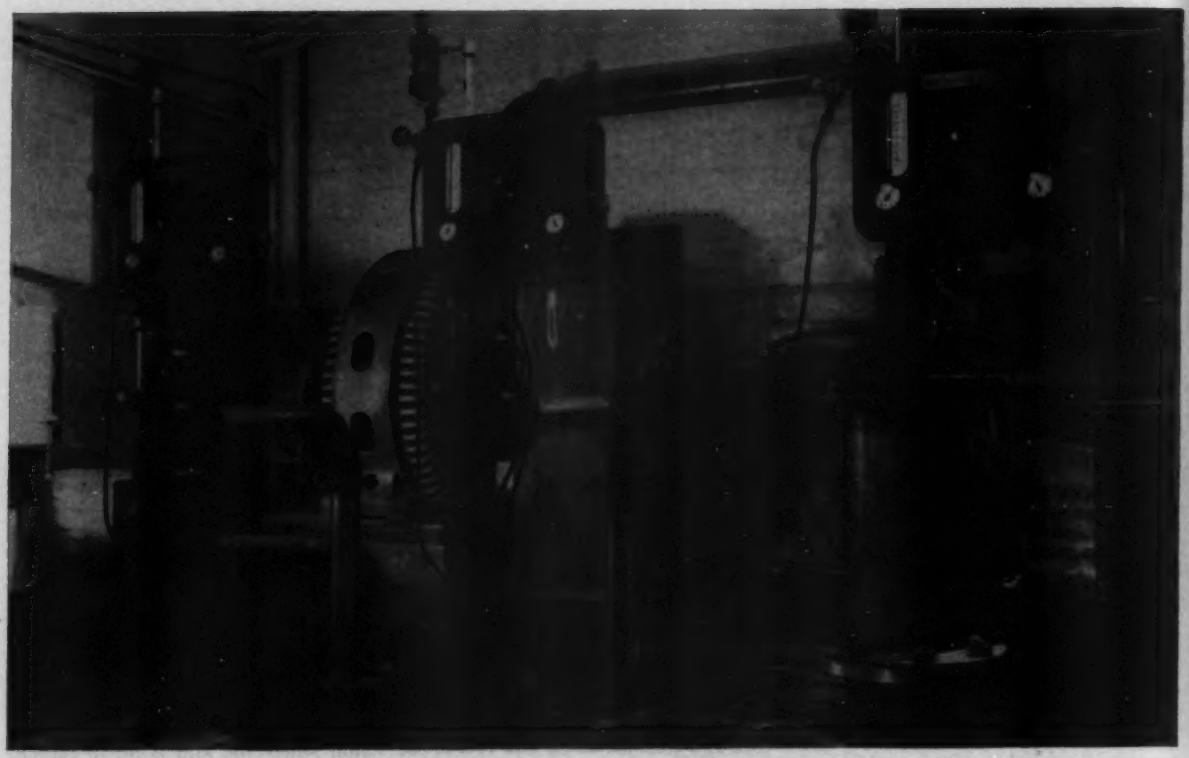

Fig. 1—F&P Ratosleeve flow control meters of this type are installed in many mills for the measurement and control of paper stock

The role of flow control in basis weight and caliper control*

ARTHUR L. LANDESMAN
Application Engineer
Fischer & Porter Co.

▶ A basis weight control system must take into consideration all control variables.

▶ No single instrument can fulfill the requirement which is best met by employing a cascading system of all the best control devices available.

THE ASSERTION, "I CAN MAKE good paper and hold to basis weight specifications without any fancy instrument" is often made by many old-timers among papermakers and thrown at appropriate occasions at instrument salesmen. Actually, this assertion is valid to a certain extent because these papermaking artists were making acceptable paper long before "fancy" instruments were developed.

Having made this admission, I still wish to show the need for modern instrumentaton for control of paper basis weight and caliper. Perhaps the need exists merely because the skill of the oldtimers is not being handed down to us of the younger generations. However, I prefer to look at it from a different viewpoint. Increasingly severe competition in the industry, coupled with ever-increasing rates of production, has brought larger mills with larger and more complex machinery. More rigid product specifications have and will continue to be imposed upon the production people. Neither mill management nor the ultimate user of paper or paperboard will be satisfied with a basis weight fluctuation of ±5 per cent if it is possible to hold it at ±3 per cent. Mill management will not be satisfied with the present rate of product rejection due to off-weight if it is possible to reduce that rate economically.

These then are the principal reasons for replacing human know-how and its inherent inconstancies with precision instruments to control basis weight and caliper. Of course, a man's brain must tell the instrument what to do, but once the instrument

*This article, which is being given exclusively to The PAPER INDUSTRY in the business paper field, is from a paper presented March 10 in Watertown, N. Y., at a meeting of the Northern District of Empire State Tappi.

Fig. 2—Control panel for stock preparation and treatment system supplied to New York & Pennsylvania Co. at Johnsonburg, Pa.

has been set, it will continue to hold that control point without variation until the brain decides a change is required. Another reason for instrument control of basis weight represents money in the company's treasury. One paper mill in New York has stated that installation of a Fischer & Porter stock flow rate controller (Fig. 1) has enabled them to constantly "shade down" and hold to the lower limit of the weight specifications. Since this mill sells its product by area, that is, by the ream, the weight-saving is a direct dollar saving which at this particular installation has amounted to several thousands of dollars per month. Holding the lower weight limit is a saving of money to the customer who buys on the weight basis; while the papermaker gains in good will.

Control variables

All of the factors which affect control of basis weight can be condensed to four principal variables. They are:

1. Retention of furnish on the wire.
2. Machine speed.
3. Flow rate of stock to the machine.
4. Consistency of the stock delivered to the head box.

Retention of furnish on the wire

While retention depends on a combination of conditions, the discussion of which is best left to more experienced papermakers, it may be said that, for a particular grade of paper, constant retention depends largely upon constant composition and treatment of the furnish.

Stock preparation systems vary from mill to mill. The control of stock preparation also varies tremendously from one location to another.

The instrumentation for stock preparation ranges from a simple indicating flow meter for adding a small stream of rosin size up to complete control systems for blending continuously several additives with several types of slushed pulp. For example, F&P recently supplied a large complete control system for stock preparation at a mill in western Pennsylvania. This instrumentation has been the means of converting from an out-dated batch process to a modern continuous stock preparation system which assures a uniform furnish for five paper machines. Briefly, five complete flow measurement and ratio control units automatically blend three types of slush pulp. Chemical additives are under instrument flow control. Stock treatment is also uniform since the flow to each of six refiners is also regulated by F&P flow control equipment. (Fig. 2)

Machine speed control

Machine speed is satisfactorily measured and controlled by existing tachometers and other electrical instruments. Most of us will agree that, during normal running times, speed of the paper machine fluctuates to only a slight degree. However, it is during those warm-up periods and during a change of speed due to a change of paper grade that adjustments for machine speed are desirable. The adjustment required is a change in the volume of stock fed to the machine.

Flow rate of furnish to the machine

The third principal variable in basis weight control is flow rate of furnish. With retention, machine speed and the minor variables being negligible during normal runs, the control of basis weight depends entirely upon delivering a constant net weight of fiber to the wire. Control of both volumetric flow rate and consistency are required to deliver a constant weight rate of flow. Consistency control coupled with manual control of flow is not sufficient. The

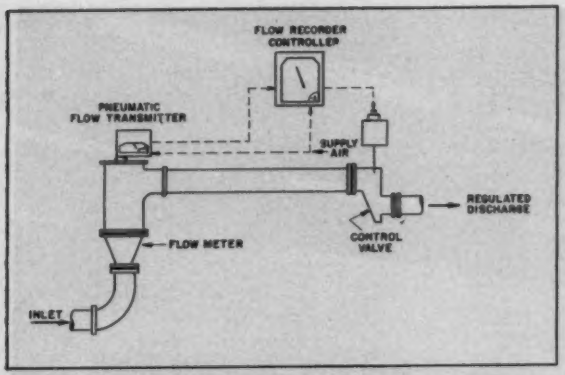

Fig. 3—Sketch of an open stuff box used to regulate the flow of paper pulp

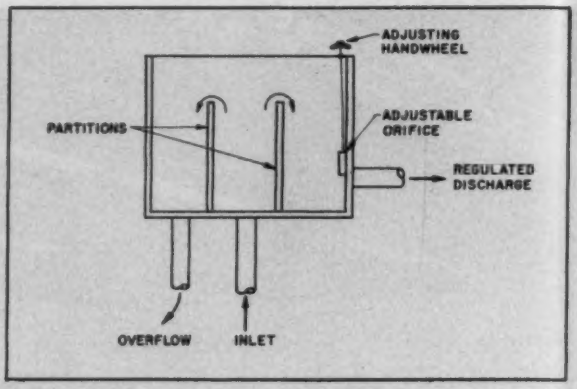

Fig. 4—Sketch of a closed flow control system for slushed stock

pressure upstream of manual flow regulating valves can fluctuate with changes of level in stock chests, with wear on pump impellers, etc. It is necessary to eliminate the effects of such pressure variations by employing some other form of flow rate control.

Either one of two methods of stock flow control is commonly employed in paper mills. The oldest method is the use of an open stuff box containing a fixed weir, which the stock overflows to maintain constant head on an adjustable stuff gate by which the rate to the machine is controlled (Fig. 3). The alternative is to use a flow control system composed of a flow rate meter, automatic control instrument, and pneumatic control valve. (Fig. 4).

The advantages of the alternative emphasize some of the undesirable features of an open stuff box. They are:

1. The flow meter is installed directly in the stock piping and results in a closed stock system. The open overflow of the flow box frequently results in entrainment of air which can interfere with sheet formation. This fact is affirmed by the development of the pressurized machine head box, one of the benefits of which has been the elimination of another point of air absorption.

2. Since the overflow is at atmospheric pressure, it requires large return piping to minimize pressure loss during the long run to the machine chest. This piping is expensive; the horse power required to recirculate the overflow stock also represents wasted money.

3. The recording control instrument provides a permanent record of flow rate, useful as a guide to both the operator and supervision. One can have visual proof that this variable is being held constant. The instrument also provides a fine calibration scale with numbers which permit easy resetting to a desired control point. Inexpensive but accurate control stations can be used to permit setting the flow controller from either the wet or dry end of the machine. A mill in New York State has installed a Fischer & Porter control system for this purpose. The equipment assists in close control of basis weight, and the remote control feature saves much operator time and energy formerly spent in climbing up to adjust the stuff gate.

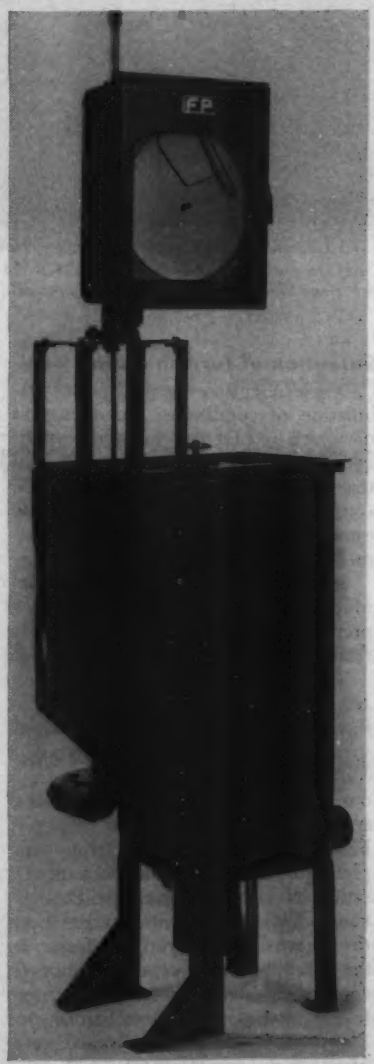

Fig. 5—F&P Consistorator for regulating the consistency of furnish to machine chest at 2-3 per cent

4. Because they require gravity flow, stuff boxes are frequently located where they are inconvenient to reach or where the atmosphere is uncomfortable for personnel. This disadvantage is particularly emphasized on start-ups and grade changes; modern instruments save many steps and much stair-climbing.

5. A modern automatic flow controller will permit coming to weight faster than with a manually operated stuff gate. A good automatic controller responds instantly to a deviation from the control point.

Consistency control

The last factor in basis weight control is consistency control. It is obvious that control of consistency is required in order to deliver a constant weight of fiber to the paper machine. Usual practice is to control the consistency, in the 2-3 per cent range, of the stock going to a regulating or mixing box where it is further diluted with white water before it goes to the machine (Fig. 5). There is a great field for a more accurate consistency regulator and for a unit which regulates from an accurate

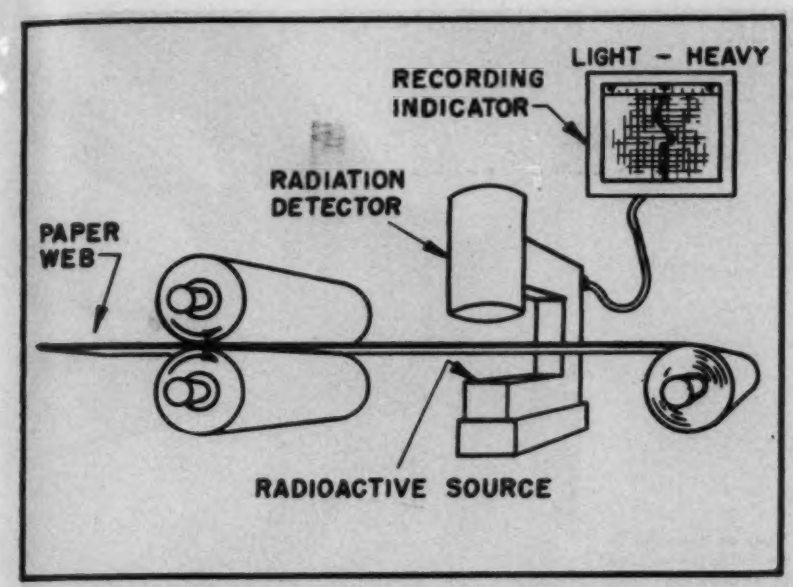

Fig. 6—Sketch of beta-ray type basis weight recorder

measurement of the consistency of the diluted stock (0.25-1.0%).

Even when they operate to the limits claimed by the manufacturers, these devices are the source of greatest error in a basis weight control system. For example, a regulator operating at 3.0 per cent consistency controls to within $\mp$0.1 per cent consistency. At the extremes of the limits the regulation involves, therefore, as much as 3.3 per cent error. Since the errors involved in all the variables are additive, we can say that the weight or thickness control can be no better than the control of stock consistency.

From a technical viewpoint, it is true that, whenever possible, control systems should be based on a measurement of the variable to be controlled.

Direct basis weight measurement

It is largely because of stock consistency variations that thickness controllers and also basis weight controllers of the beta-ray type have found wide application (Fig. 6). Undoubtedly these instruments are capable of reducing caliper and basis weight fluctuations, and they have proved their value. However, these devices cannot control paper basis weight by themselves — they need help. Whether the weight sensing device be located at the wet or dry end of the machine, an appreciable time lag exists between measurement and corrective action of stuff-gate or flow control valve. If other variables such as flow rate, consistency, and moisture content were uncontrolled, the long time lag would cause the basis weight controller to cycle continuously out of control.

It has been said that thickness and weight controllers would not be necessary if a more accurate consistency regulator were available for use with modern flow control systems correlated with machine speed. However, I prefer to believe that a basis weight control system must be a completely cooperative venture. The function cannot be fulfilled by a single instrument. It must be accomplished by employing a cascaded system combining all the best control devices available.

Gas Turbines

(Continued from page 255)

compared with comparable multiple-extraction condensing steam units.

Space requirements are small, and the cost of the supporting and enclosing structure is low.

Maintenance on an impressive number of presently operating gas turbines is surprisingly low. One unit which was on the line since July, 1949, showed, at 27,000 hours, total maintenance costs of around one dollar per kw of summer capacity. Machines built since then will show even lower maintenance figures.

Quick start-up possible

Start-up is simple and fast; and a stone-cold unit can be put on line in 10 or 15 minutes, against the hours required to fire up steam boilers and warm up steam turbines. This fast start-up shows up prominently in the numerous applications in locomotives with 4500 traction horsepower, which are fired-up and promptly driven away with full load and no fuss.

Controls are simple

Control is simple and effective, requiring minimum attention. It is easily amenable to fully automatic operation with remote supervision and control. The standard controls include automatic alarm and shut-down, against loss of fuel, flame or lube oil pressure. Excessive vibration, exhaust temperature, or bearing temperature sound an alarm but do not shut down the unit unless the trouble remains uncorrected for some predetermined time. One single switch easily controls the entire starting sequence.

Liquid fuel firing possible

Combustion gas turbines may be fired by liquid fuel. There are large units in both Great Britain and Holland which are fired by Bunker C. with, however, considerable purification. In the United States, a number of units are fired with distillate and pre-treated light oils, such as No. 2 fuel, diesel and similar oils. Natural gas is, however, the preferred fuel since it eliminates problems of corrosion and erosion in nozzles and blading. The liquid fuel possibility must be mentioned here because it is one of the possible solutions of the pulp and paper mill problem concerning the "interruptible" clauses in most natural gas contracts which involve rates that might appeal to such customers.

There are other ways in which the pulp and paper mills may combat the "interruptible" problem which need not be herein detailed.

We believe that, in any case and particularly where natural gas may be available, or may shortly become available, it will pay handsomely to include in any proper study, a consideration of the combustion gas turbine.

In conclusion we are happy to quote one of the leading gas turbine manufacturers whose gas turbine literature includes the advice: "However, each case should be carefully studied by competent engineers so that accurate and complete installation and operating costs are established."

How to extend the life of rolls

DAVE KUNIHOLM*

Flaws or blemishes in the finish are avoided by keeping rolls on a super-calender stack free of build-ups; and, at the same time, the roll surface is protected from indentations and pitting

GOOD CARE will prolong the life of many types of rolls being used in normal service throughout the industry. Good care begins with good handling practices. Extreme caution should be exercised when uncrating a roll to avoid damage to the roll surface by hammers, pinch bars, or other tools. When removing a roll from its crate, always rest the roll on the journals; avoid contact of the surface with the floor where chips or foreign matter will gouge the surface.

When moving a roll by slings attached to the shafts, be extremely careful to prevent the chains from fouling the shafts or the ends of the working face of the roll. Place a piece of rubber or leather belting between the chain and the journal and a block between the chain and the working face to prevent contact with the chain. The recommended method, if the rigging is available, is to use a broad belt sling around the middle of the roll.

The maintenance hints presented in this article for a number of specific types of rolls will enable paper mills to save money on roll replacement.

Stainless steel rolls

The following precautions and maintenance practices should be observed with stainless steel rolls when in use:

1. The corrosion resistance of stainless steel is due to the formation of a chromium oxide film on the surface. Between operations wash and clean the surface and allow it to dry. Drying permits the reformation of the oxide film.

2. Clean with a soft cloth and warm soapy water. Follow with a thorough rinse in clear water and dry with a soft absorbent cloth.

3. Do not use steel wool to clean the surface. Small particles of steel will imbed in the stainless steel and form rust. Where an excess accumulation of dirt requires more effective cleaning than soapy water, a 10 per cent solution of sodium citrate may be used on a moist cloth, sprinkling on a light dusting of whiting and rubbing the dirt, rust or stain marks vigorously. Follow with a thorough rinsing and drying.

4. Any welds on a newly manufactured roll should be passivated to reestablish the chromium oxide film. This is done by treating the stainless steel with a 20 per cent solution of warm nitric acid followed by a thorough rinsing and drying. Where operation of the roll tends to remove the oxidizing film, an occasional passivation, as described, will extend the corrosion resistance and life of the roll.

5. Remove greases and oils on the surface by vapor de-greasers such as trichlorethylene and perchlorethylene, or by washing and rubbing down with organic solvents, such as carbon tetrachloride, kerosene, or gasoline. Any abrasives in the grease or oil should be completely removed by washing in soapy water, rinsing, and drying.

Rubber rolls

When in storage, it is important to (1) cover rolls with paper to reduce oxidation; (2) store in a cool, dark, damp place at about 50-60°F; (3) rest rolls on journals, not on rubber surface; (4) avoid temperature below 32°F, for serious damage can result from freezing; (5) re-grind rolls if stored more than 6 months.

To insure continued quality performance and a long life of rubber rolls when in use, (1) re-grind rolls often to remove oxidation; (2) keep same pressure at both ends of roll; (3) keep rolls from resting on rubber surface when not in use; (4) keep rubber clean to avoid breakdown from oil, gasoline, kerosene, and other distillates; (5) watch bearing lubrication; heat or oil transmitted from roll shaft will lead to breakdown of rubber covering.

Facts to remember are that (1) most rubber coverings become slightly harder with age; (2) rubber rolls are slightly harder when cold and slightly softer when hot; and (3) rubber roll surfaces will oxidize causing small cracks that will deepen; grind surface frequently to remove oxidation.

Chromium plated rolls

For long time storage, clean surface thoroughly, dry off, then apply neutral grease coating.

Chromium plated rolls are designed to provide protection against wear and corrosion and, in some cases, to improve the end product being manufactured. Therefore, the

*Manager of Industrial Rolls Div., Rodney Hunt Machine Co., Orange, Mass.

Larger diameter on ends reveals need for regrinding face of top rubber-covered press roll to prevent failure of covering and restore efficiency of working surfaces

following precautions will help to obtain the full benefits of this versatile coating.

1. At the end of each day's run, wipe the surface clean and dry. Powdered whiting with water, or a simple paste like Bon Ami, will do an excellent job. If the roll is located in a position where there can be drippage from exhaust ducts, etc., rolls should be covered.

2. If the chromium surface is accidentally nicked or scored, a hand stone should be used to rub down high spots and sharp edges.

3. If a doctor blade or wiper blade is used, be sure that there is proper adjustment between the blade and the roll, particularly at the time of starting. Should any signs of scoring develop, lift the blade promptly and resharpen if necessary. If any chromium dust has become imbedded in the blade, it can be detected by wiping copper sulfate across the edge. Copper sulfate will leave a reddish color on the steel, while the imbedded chromium dust will remain bright. This should be removed before the blade is put into service.

4. Avoid rapid temperature changes. Heat or cool gradually and rotate roll, if possible.

5. Avoid injurious acids such as hydrochloric. Wash off thoroughly and promptly if accidentally applied.

6. Cover rolls with a cushioning material to avoid damage by falling objects or tools during maintenance of machine.

Wood rolls

There are three general types of wood rolls:

1. Solid rock maple log rolls contain a maximum amount of moisture, operate wet at all times, and must be protected against drying out.

2. Rolls made of air seasoned wood, usually ranging in size from 3 to 9 inches in diameter, contain 15-25 per cent moisture, operate under wet or moist conditions and must be protected against accelerated moisture removal.

3. Rolls made of kiln-dried wood contains 5-8 per cent moisture, operate dry or slightly moist, and must be protected against absorbing excessive moisture.

Log rolls

When log rolls are in storage, (1) protect metal parts with rust preventive and submerge roll in tank or canal, being kept as cold as possible; and (2) store rolls in dripping wet sawdust or wrap in several layers of wet burlap, maintain low temperature and keep wet at all times.

When in use, (1) let water trickle over rolls from perforated water pipe and hang cloth or burlap over pipe to come down over sides of rolls, keeping rolls wet and preventing warm, dry air from striking roll surface; and (2) don't discard worn out log rolls before salvaging the metal fittings, which are reusable.

Air seasoned wood rolls

In storage, protect the shafts of air seasoned wood rolls with rust preventive, keep roll wrapped in heavy kraft paper, and store in cool, damp location.

When in use, (1) inspect periodically, remove any warped roll, taking a truing out on the surface to eliminate whipping and out-of-balance condition which will loosen shaft anchorage, and return to service; and (2) during idle or down periods, wet rolls once a day with hose to prevent surface splitting due to wood drying out.

Kiln-dried wood rolls

Protect shafts with rust preventive, wrap roll in kraft paper and store at room temperature in dry location.

When rolls are in use, (1) recoat surface periodically with shellac, varnish, or other plastic-type finish to seal wood pores; and (2) take truing cut and refinish surface if rolls show indication of warpage.

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Like other leading companies, the New York & Pennsylvania Company, makers of fine book and specialty papers, found that Fischer & Porter offered them integrated instrumentation and control systems — *all from a single source.*

Converting their Johnsonburg, Pa., mill from batch-type stock preparation to continuous automatic stock preparation called for five separate blending systems feeding five separate paper machines, plus a complete refiner control system — all integrated into one centralized control station. And to get the jump on competition, the N.Y. & Pa. Co. had F&P do a complete conversion all in one fell swoop!

Write for details on the F&P Ratographic* miniature pneumatic recorder-controller, offering 4-inch strip chart record.
*T.M., F&P Co.

From one source, the N.Y. & Pa. Company obtained the engineering experience and know-how to design and instrument the system, the specialized meters (e.g., Ratosleeve* stock meters) and valves (e.g., Ratogate* stock valves) and instruments (all of F&P design and manufacture) to control the processes, and the complete panel fabrication right down to the last graphic symbol.

Because the complete package was obtained from one team, responsibility for delivery and performance was not divided, the cost far less. Perfectly matched instruments, rather than non-mating components, meant complete satisfaction for this customer.

Write today and tell F&P your needs — the answers will be yours quickly, without obligation. Compare and you must agree — F&P *is the one source that stands out.*

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NEWS of the INDUSTRY

DRYER SECTION of new Yankee tissue machine at St. Helens Pulp & Paper Co. In the foreground is Clair Milne, machine backtender; at the console panel in the rear is George Todd, machine tender. The huge Yankee drying roll that makes the machine unique is housed in the framework at left center. It is two stories in height

ST. HELENS officials inspect one of the first rolls of tissue to come off the new Yankee machine at the Oregon plant. Shown at the giant roll are R. J. Schadt, resident manager; Arthur Newcomb, paper machine superintendent, and Ray Dahl, assistant resident manager and project engineer

World's Largest Yankee in Operation at St. Helens Pulp & Paper

THE WORLD'S LARGEST Yankee-type tissue machine has produced its first sheet of paper at the St. Helens, Ore. plant of St. Helens Pulp & Paper Co. Start-up of the unit highlighted a $14,000,000 modernization program that began when the plant was acquired by Crown Zellerbach Corp. in 1953.

Also included in the expansion project was the construction of a two-story building to house the machine, plus extensive improvements to existing equipment.

Built by Beloit Iron Works, the papermaking unit produces a continuous sheet more than 20 ft. wide. The total daily capacity is 90 tons of dry crepe toilet, napkin and facial-type tissue. The output is being shipped to C-Z converting plants in San Leandro and Los Angeles, Cal., and Camas, Wash.

335 Tons Daily

According to R. J. Schadt, St. Helens resident manager, operation of the Yankee machine—together with improvements to two other machines—will raise the mill's potential producing capacity to 335 daily tons.

The unit boasts a 258-in. wire and is equipped with a 12-ft. diameter Yankee dryer. It is designed to operate at speeds up to 3000 fpm. At 2000 fpm the capacity is 120 tons of 14-lb. tissue per 24 hours.

The new structure housing the Beloit machine is of reinforced concrete and steel and measures 92 by 300 ft. It differs slightly from the usual machine room in that the roof, instead of being framed with steel trusses, is framed with large rolled steel girders designed by the cantilever principle to allow expansion for the possible installation of a similar machine in the future. In that case, there would be a common tending aisle and a clear span roof.

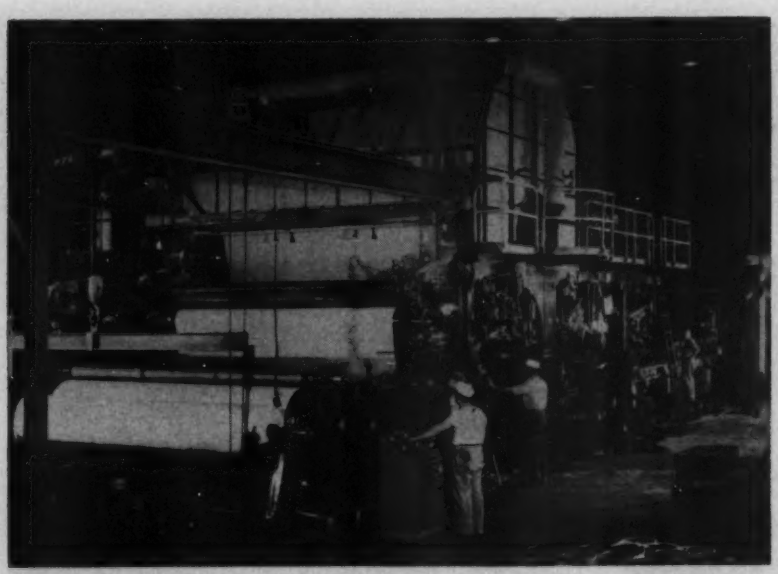
A modern dust-collection system has been provided, consisting of a 25,000-cfm capacity Rotoclone on each of two winders and an 18,000-cfm Rotoclone on the calender and reel section. This system, as well as the complete heating and ventilating set-up and the machine hot air and hood exhaust equipment, was furnished and installed by Drew Engineering Co. of Portland. The air supply to the hood has a capacity of 123,000 cfm, while the machine room heating and ventilating system has a total capacity of 128,000 cfm.

Stock from Two Sources

Normally, stock furnish for the machine comes from the bleach plant via a high-density storage tank, from which it is pumped after diluting to 4 per cent consistency with an Impco dilution system. Other stock for blending enters the plant in dry noodle, lapped or dry baled form and is slushed in a 4000-lb. batch-type Morden Slush-Maker. Pulp is transferred to the Slush-Maker from the storage area by means of a 30-in. belt conveyor. Noodle pulp is fed to the conveyor at a uniform rate by a Heil automatic feeder.

Following agitation in the stock chests, the stock is fed through a proportioner to the blending chest and machine chest.

Refining is done by two No. 5 Miami jordans manufactured by Shartle Bros. and all stock passes through Bauer centricleaners before going to the fan pump. A circulating stock pickup is used.



INSTALLATION of the eighth Yankee type paper machine has been completed at the Green Bay, Wis. plant of Marathon Corp.'s Northern Paper Mills Div. The new Beloit Iron Works unit, which has a wire width of 172 in. and a trim width of 162 in., produces stock for Northern's toilet tissue

The machine itself has a pressure headbox, removable fourdrinier with a 75-ft. wire; 32-in. diameter suction couch roll; plain pickup roll; a suction press; two 40-in. diameter suction pressure rolls on the Yankee; a 12-ft. diameter, 125-lb. pressure Yankee (weighing 80 tons); two horizontal, two-roll calender stacks, and a transfer-type reel capable of winding rolls up to 72 in. in diameter. All machine equipment was furnished by Beloit.

From the reel the paper rolls are carried to either of two winders by a 10-ton monorail and hoist system. Monorails and switches were furnished by Industrial Crane & Hoist Corp. Two all-electric hoists are products of Harnischfeger Corp.

The two winders with tape-driven unwind stands are of the high-speed, double-drum type and capable of winding rolls up to 50 in. in diameter at a maximum speed of 4500 fpm. Twenty individually motor-driven slitter units are provided for each winder.

The drive for No. 3 machine is a General Electric electronic amplidyne control sectional unit with individual generators for each section. Thus, each section is an individual unit tied into the whole with a speed type regulator.

Motor Power

The Yankee felt section is energized by a 750-kw dc generator driven by a 1250-hp synchronous motor. The dc motors for this section are: Yankee, 500 hp; second press, 200 hp; first press, 200 hp; suction press, 200 hp; top wringer roll, 200 hp, and bottom wringer roll, 50 hp.

The fourdrinier section is energized by a 200-kw dc generator as the third unit of the above motor generator set. The dc motors for this section are a 200-hp wire turning roll unit and a 50-hp couch drive. The first and second calender and reel sections are driven by 50-hp dc motors energized by three 50-kw generators driven by a 200-hp ac motor.

The two winders are driven by General Electric dc adjustable voltage winder drives with amplidyne control and mechanical tension backstands. Each winder has a 125-hp dc single motor drive with an adjustable "V" belt tie between the front and back drums. Each drive motor is energized by a 100-kw MG set driven by a 150-hp ac motor.

Each machine section and winder has its essential control elements (meters, gauges, etc.) mounted in console type cabinets at convenient locations on the tending side of the machine. The less essential controls are mounted in erect type cabinets on the back side.

Auxiliary Equipment

Some of the major items of auxiliary equipment are: 30-ton capacity Ederer machine room bridge crane with a 65-ft. span; a 42- by 304-in. Farrel-Birmingham roll grinder; a 260-in. Hanchett doctor blade grinder; a Worthington two-stage, 800-cfm air compressor; seven Roots-Connersville vacuum pumps; an 8-ft. diameter by 16-ft face vacuum type saveall made by Improved Machinery.

Additional Suppliers to St. Helens

Fan Pump	Worthington Corp.
Dryer Drainage System	Ross Midwest Fulton Corp.
Lubrication System	Bowser Inc.
Machine Broke Chest Disintegrator, Liebeck	E. D. Jones & Sons Co.
Stock Chest Agitators	James Brinkley Co.
Consistency Controllers	DeZurik Shower Co. Minneapolis-Honeywell Regulator Co.
Repulper	Morden Machines Co.
Traction System	Engineering Products Co.
Roll Header	Valley Iron Works
Roll Wrapper	Lamb-Grays Harbor Co. Inc.
Lowerator	Colby Steel & Mfg. Co.
Electric Motors	Allis-Chalmers Mfg. Co. Westinghouse Electric Corp.
Motor Control Cubicles	Westinghouse Electric Corp.
Dilution and Agitation System for 175-ton High-Density Storage	Improved Machinery Inc.
Stock Proportioner	Trimbey Machines Inc.
Tile Linings	Chemical Linings Inc.
High-Density Bleached Stock Storage Tank	National Tank & Pipe Co.
Motor Control Centers	Westinghouse Electric Corp.
Control Instruments and Panels	Minneapolis-Honeywell Regulator Co.
Conveyor	James Brinkley Co.
Gear Reducers	Western Gear Works

Southern Chemical Cotton Adds Purification Plant

Southern Chemical Cotton Co. of Chattanooga, Tenn., has expanded its facilities by the addition of a new purification plant. The project consists of a new building to house equipment for continuously cooking, washing, and bleaching approximately 200 tons of finished linters (chemical cotton) per 24 hours.

In addition to effecting important operational economies, a much more uniform product is expected. All equipment, including digester, brown stock and bleach washers, bleach mechanical equipment and towers, has been generously sized in order to provide adequate flexibility. All operations are controlled from a single graphic instrument panel, where the operator can visualize what is happening in all stages of the operation and can accurately control any or all phases of the process. Engineering the project was J. E. Sirrine Co.

MILL OF Valentine Pulp & Paper Co. at Lockport, La., where a 50 per cent production increase in bagasse paper was recently announced

PAPER MADE from whole bagasse coming off the machine at Valentine Pulp & Paper. Heretofore, the bagasse has been largely a waste product

U. S.'s Only Bagasse Mill Expanding

The only plant in the United States using whole sugar cane bagasse for paper manufacture is being expanded panded from 50 to 75 tons daily.

The plant is that of Valentine Pulp & Paper Co., located near Lockport, La. The $5,000,000 operation is owned jointly by Brown & Root Inc. of Houston, Texas, and Valite Corp. of New Orleans.

Bagasse, the dry stalk of sugar cane after the juice has ben extracted, has long been a "waste and a nuisance," although some has been used for boiler fuel and for the manufacture of wallboard.

The Valentine process, which is patented wherever sugar cane is grown, provides a new market for a material that was formerly hardly worth the expense of baling. It is estimated that Louisiana produces 800,000 tons of dry bagasse annually, less than 40 per cent of which is used.

Valentine Pulp & Paper is now producing mostly letterpress and offset printing stock, white tablet and envelope paper. Some grades have been used in multiple printing forms, and a few special runs have been released for newsprint. Experimental runs have produced crepe and glazed tissue of excellent quality; machine finish book; napkin and place mat papers, and heavier grades suitable for food packaging.

Alaska Pine to Convert Hemlock Bark in B. C.

Alaska Pine & Cellulose Ltd. will build a $1,000,000 silvichemical plant at Marpole, near Vancouver, B. C. From hemlock bark the plant will manufacture Rayflor, which is used in oil well drilling operations for hardening the mud that clogs drill holes. Hemlock bark has always been considered a waste product.

The plant will be the first of its kind to go into commercial production and will supply the compound to drilling operations all over the world.

Alaska Pine & Cellulose, which is controlled by Rayonier Inc., currently has an $8,000,000 expansion program underway, of which more than a quarter will have been spent by the end of 1955.

Nova Scotia Hopes for New Pulp, Paper Mill

Nova Scotia is working hard to get another pulp and paper mill.

Detailed surveys of the province's timber resources are being made, and W. T. Dauphinee, trade and industry minister, has revealed that Hearst interests are now considering a much larger operation than was originally planned. (Last fall, Hearst Publishing Co. was "looking into" possibilities of building a 200-ton, $10,000,000 newsprint mill at Sheet Harbor. Hearst already controls a groundwood mill here through its subsidiary, Halifax Power & Pulp Co. Ltd.)

Minister Dauphinee has indicated that the results of a Cape Breton Island forest survey have been given to a Canadian-British group, with whom negotiations were underway in 1953, and to other interests.

Powell River to Add Ninth Machine in $20,000,000 Program

Installation of Powell River Co. Ltd.'s ninth paper machine at Powell River, B. C., has been announced jointly by Harold S. Foley, board chairman, and M. J. Foley, president. Extensive plant changes in auxiliary facilities will bring the cost of the firm's latest development program to approximately $20,000,000.

It is expected that the new machine will boost Powell River's newsprint production by some 90,000 tons annually, or 25 per cent.

(The firm, already the world's largest single-unit newsprint producer, turned out a record 375,951 tons in 1954.)

Construction on No. 9 machine will start this summer, and production is scheduled for the fall of next year. Power needed for the expansion will be made available at that time by the B. C. Electric through the newly-approved $4,400,000 transmission line from Squamish.

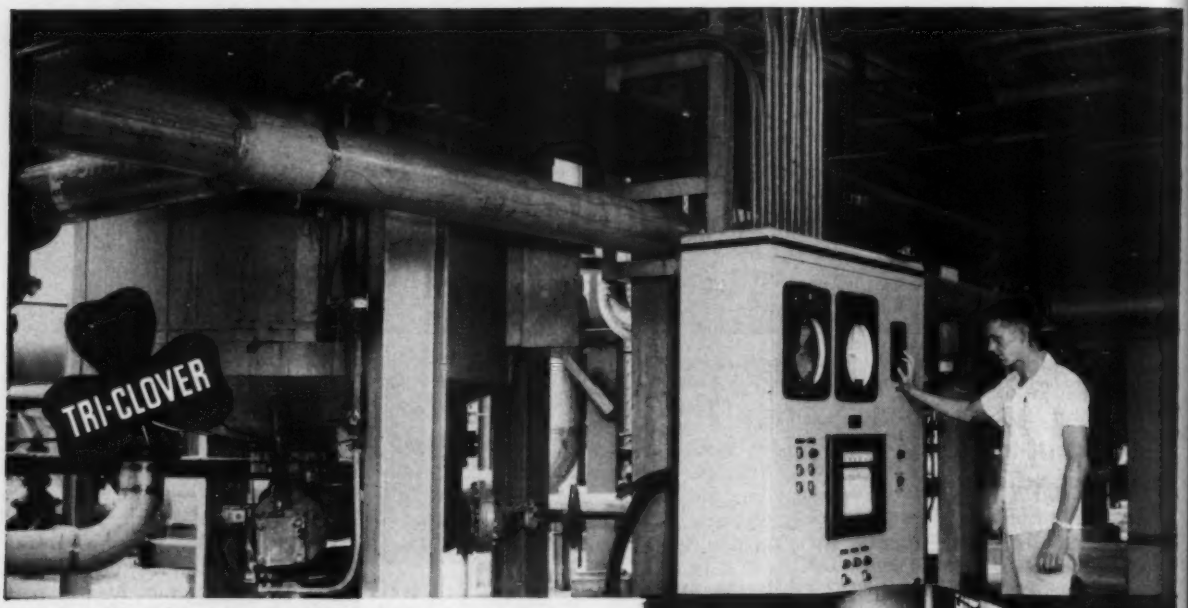
During the past 10 years Powell River has spent $5,000,000 on expansion and modernization. In making the announcement, President Foley declared, "We have the utmost confidence in the world demand for newsprint, and this expansion is designed to keep that demand well satisfied."

Rayonier Directors Meet In Paris, Approve $30 Million Cellulose Plant

Meeting recently in Paris, directors of Rayonier Inc. gave their approval to the construction of a $30,000,000 cellulose plant. No site has yet been chosen for the operation, which will be built as soon as plans can be drawn up.

The new plant will be in production within two years and is expected to boost the firm's output of cellulose to approximately 880,000 tons annually.

The announcement was made at the end of the first meeting ever held by the Rayonier board abroad. According to Clyde B. Morgan, Rayonier presi-



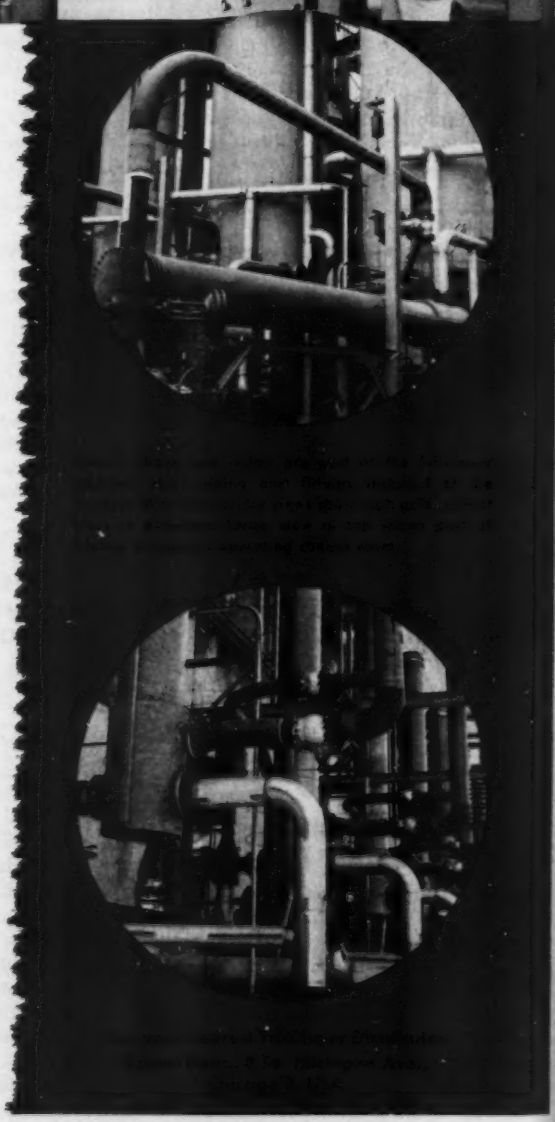
Ultra Modern Cellulose Mill Makes Wide Use of TRI-CLOVER Stainless

Sixteen thousand feet of stainless steel piping—that's what it takes to handle the acids and other corrosive liquids used in processing at Buckeye Cellulose Corporation's new plant at Foley, Florida.

"Buckeye Cellulose", which is a subsidiary of Procter & Gamble Company, built the ultra-modern dissolving pulp mill for the production of several grades of high quality cellulose pulp.

To protect the quality of the cellulose, only the most highly corrosion-resistant materials were used in the processing operations. And that's where Tri-Clover enters the picture. Tri-Clover stainless steel piping and fittings, widely used throughout the new plant, provide full corrosion-resistance to "cooking liquors" and other acids and provide the maximum degree of protection against product contamination.

Tri-Clover experience and facilities helped Buckeye Cellulose solve its problems of corrosion in the planning stage . . . with a complete line of highest quality stainless steel fittings, pipe and tubing, plus experienced engineering service. We are extremely well qualified to help solve your corrosion-resistant problems whether in the planning stage or plant operations.



LADISH CO.
Tri-Clover Division
Kenosha Wisconsin

TRI-CLOVER

1455

dent, the Paris gathering was aimed at acquainting board members with the vast European market and at the same time "to impress our customers in Europe that we take their affairs seriously."

Since World War II, the firm has increased its annual production capacity 75 per cent in the United States alone, building overseas sales in 1954 to more than 100,000 tons, about 24 per cent of the firm's annual capacity.

Everett P&P Changes Corporate Name

On May 15, Everett Pulp & Paper Co. officially changed its corporate name to Simpson Paper Co. No change in product or business policies is contemplated, as the new name merely reflects the change in ownership that took place in 1952, when the firm was acquired by Simpson Timber Co.

Simpson Paper was incorporated in 1891 as Puget Sound Pulp & Paper Co. In July 1892 two machines were producing about 15 tons daily. In March 1895 the name was changed to Everett Pulp & Paper, and shortly after 1900 the firm became wholly locally owned when it was purchased from eastern interests.

Scott to License Use of New Bleaching Processes

Scott Paper Co. has announced a program under which it will grant licenses for the use of its recently patented improved processes for bleaching groundwood pulps.

On April 26, U. S. Patents 2,707,-144; 2,707,145 and 2,707,146 were granted to Scott on processes involving the use of hydrosulfite for bleaching wood pulps. The firm has patent applications pending in Canada and other foreign nations. It is said that use of the processes results in brighter pulp and a reduction in bleaching cost.

Basis of the licensing program is a royalty of ½ cent per pound of hydrosulfite used. The charge will average only 10 cents per ton of pulp bleached.

Bowater Plans Expansion on Two Continents

Plans for multi-million dollar expansion on two continents has been announced in London by Bowater Paper Corp. Ltd. The expansion, believed to be the largest ever undertaken by a paper manufacturer, was prompted by the "encouraging" outlook for world consumption of paper and allied products.

During 1955 the British firm expects to regain its pre-war position as the world's largest producer of newsprint. At that time, Bowater was boasting an average daily output of 1.5 tons a minute.

According to the company's annual report to shareholders, Bowater's 1955 newsprint output will reflect an increase in annual capacity of some 200,000 tons, or more than 20 per cent. This will result largely from the first full year of operation of the Calhoun, Tenn. mill of Bowaters Southern Paper Corp. and the forthcoming addition of a sixth paper machine at the Kemsley Mills in England.

The Tennessee mill began operations in July 1954. Its rate of production of newsprint and kraft pulp "has exceeded all expectations." Newsprint is being turned out at an annual rate of 145,000 tons, while kraft pulp is coming off the machines at a 60,000-ton clip. The initial capacities were 130,000 tons and 50,000 tons respectively.

Additional equipment is now being installed at Calhoun, and by September the level of newsprint production should reach 160,000 annual tons and by the end of 1956, 175,000 tons.

Speed-up at Corner Brook

Capital expenditures for 1955 improvements at the plants of Bowaters Newfoundland Pulp & Paper Mills Ltd. at Corner Brook, Nfld., are expected to total between $8,000,000 and $10,000,000. Expansion calls for the speed-up of six paper machines — one to the extent of an additional 40 daily tons — the addition of four wood grinders, plus the construction of a 6000-kw power installation.

Principal expansion in the United Kingdom will take place at the Mersey and Thames mills. The plan calls for the addition of four high-speed machines — two at each mill — plus the construction of new converting plants, groundwood and building board mills. On completion of the program, the production capacity at the Mersey and Thames mills will have been increased by some 225,000 tons to reach an annual 525,000 tons.

A world-wide organization, Bowater also maintains mills in Norway and Sweden.

Japanese Firm Outlines Alaska Pulp Plans

Delegates to the recent annual convention of the Alaska Chamber of Commerce in Juneau heard a Japanese pulp company official report his firm's plans for lumber and pulp production in the territory.

Yukichi Ishida, vice president of Alaska Lumber & Pulp Co., said that

AIR VIEW of Armstrong Cork Co.'s fiberboard mill at Macon, Ga., showing proposed expansion area within the broken lines. Completion is scheduled for mid-1956

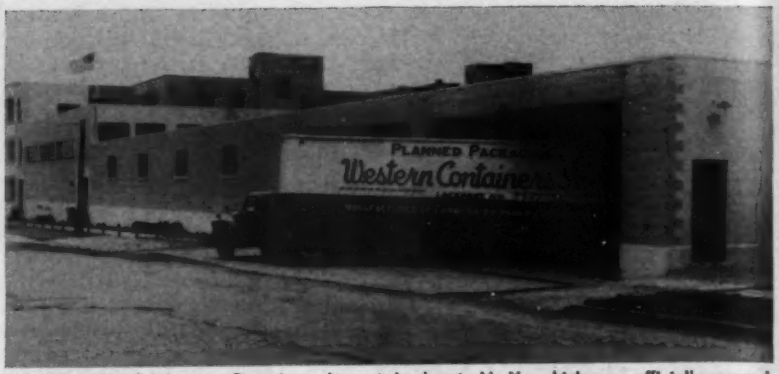
Armstrong Cork to Double Georgia Operations

Armstrong Cork Co. of Lancaster, Pa., plans to double the present capacity of its Macon, Ga., plant, making it one of the largest fiberboard mills in the world. Construction is expected to begin this summer.

The Macon plant, along with the other Armstrong fibreboard operation at Pensacola, Fla., produces a line of building products.

The expansion will add approximately 212,000 sq. ft. to the present plant. Existing buildings will be enlarged, and a second board mill will be built adjacent to the existing mill; additional grinding, pulping, screening, forming, drying, fabricating and painting equipment will be installed; the woodyard will be rearranged, and warehousing and shipping facilities will be approximately doubled. In addition, a water recovery system is to be installed.

the company is shooting for a target time of "next spring" for breaking ground on a new pulp plant at Sitka. Alaska Lumber & Pulp is a Japanese-organized firm that is operating Wrangell Lumber Co. on Wrangell Island. (It was expected that the first lumber shipment from Wrangell would be ready this month.)



NEW PLANT of Western Containers Inc. at Lockport, N. Y., which was officially opened May 3. It replaces the structure that was destroyed in a $750,000 blaze June 4, 1954. The building's 156,000 sq. ft. are devoted entirely to the production of corrugated containers. Production flows from a three-story production area to the one-story shipping area, with general offices located on the second floor. Western Containers is an affiliate of Ohio Boxboard Co. of Rittman, Ohio

Expansion Details Reported by P. H. Glatfelter

Officials of P. H. Glatfelter Co. of Spring Grove, Pa., have reported further details of the firm's expansion program centering around the installation of a Rice Barton Corp. paper machine.

All the stock preparation equipment and the paper machine screens are to be supplied by E. D. Jones & Sons Co. Primary refining of stock will be handled by a battery of Jones Double D disc refiners. Final control ahead of the machine will be with Jones Majestic jordans fitted with Accru-Set automatic controls.

For screening, four 5LW all-stainless units will be installed. These screens will be of the single-end discharge type with fabricated stainless valves and stainless drums fitted with thin section stainless plates.

A Jones Brokemaster will be located under the dry end of the paper machine to handle all broke continuously and automatically. A full complement of automatic controls, including a consistency regulator, will be incorporated. Clearing the broke will be accomplished by a Jones Stockmaster, a small high-speed conical refiner.

Eastern Corp. Strengthens Maine Timber Holdings

A subsidiary of Eastern Corp. has purchased about 60,000 acres of Maine timberlands from Dead River Co. of Bangor. Also included in the sale was Dead River's extensive pulpwood business, which for some years has been headed by D. B. Demeritt of Orono.

In announcing the acquistion, Harold Holden, president of Eastern, declared that his firm now controls more than 400,000 acres of forest lands in Maine and Nova Scotia. He explained that the purchase will "strengthen Eastern's timber holdings and forestry program and assure the company an additional long-term supply of pulpwood for its pulp and paper mills at South Brewer and Lincoln." The domestic pulpwood business now conducted by Dead River was to be gradually taken over by Eastern's subsidiary beginning May 1.

Mr. Demeritt, now vice president and manager of woodlands for Dead River, has been named vice president and manager of woodlands for Eastern. He will continue in his present capacity for Dead River. The latter firm will continue to operate its remaining timberlands in Maine as usual.

PI Expansion Notes . . .

The proposed acquisition of Watervliet Paper Co. of Kalamazoo, Mich., by **Kalamazoo Vegetable Parchment Co.** has been abandoned by mutual consent of the boards of directors of the two firms. The action was taken as the result of unfavorable proxies filed by holders of more than 25 per cent of the Watervliet outstanding stock.

National Gypsum Co. plans to build a gypsum wallboard and plaster board plant in New Orleans. Gypsum rock will be carried by ship from deposits near Halifax, N. S., which are now being developed by the firm.

Scott Paper Co., in order to increase productive capacity, will equal or exceed in 1955 the $36,000,000 spent by Scott, Hollingsworth & Whitney and Detroit Sulphite for capital additions and improvements during 1954. According to Thomas B. McCabe, president of Scott, by the end of this year six more paper machines will be producing Scott trade-marked products than were making those brands at the end of 1954.

Nekoosa-Edwards Paper Co. will shortly begin construction of a $350,000 addition to the Port Edwards, Wis. mill office building. The structure will house expanded research facilities, engineering, power and technical department offices. About one-third of the new building will consist of a pilot plant equipped with an experimental paper machine and other small-scale production equipment for research in pulping, bleaching and related manufacturing problems.

Riegel Paper Corp. has put its new coating tower in full-time operation. The equipment permits the firm to expand its present production, as well as to coat new types of paper. Located at the Milford, N. J. mill, the unit—with normal and reverse roll coating heads—permits thicker coatings than were previously possible. The coater is 125 ft. in length and will coat a web 66 in. wide.

Clintonville Paper Products Co. is a recently incorporated firm at Clintonville, Wis., for the conversion of paper into food and cheese wrapping, shredded paper, packing and padding materials.

Sealright Pacific Ltd. has officially opened its new $1,000,000 factory and headquarters building in Los Angeles. The company is associated with Sealright Co. Inc. Both are wholly owned subsidiaries of Oswego Falls Corp. of Fulton, N. Y.

BIRD'S EYE VIEW of part of Georgia shows Union Bag & Paper holdings in Burke County. Portion of the wooded area at the top and right is controlled by the firm, and photographs such as this help company foresters to determine type and density of timber stands and other valuable information. The pictures by themselves are not enough, but are simply an aid and have to be supplemented by field men. However, they have proved invaluable in helping Union Bag keep tab on its land holdings

Union Bag's Portrait Gallery for Pine Trees

IN A MATTER of minutes foresters at Union Bag & Paper Corp. can determine the status of any given tract of the firm's 900,000 acres of owned or leased timberland. By referring to the Savannah, Ga. firm's file of aerial photographs, they maintain an up-to-the-second tab on their domain.

The technical control department of the Woodlands Div. has compiled the extensive records. Each picture is 9 in. square and shows approximately 3000 acres. The photographs are made from a height of several thousand feet.

With the pictures foresters are able to determine such things as height, type and density of trees in a tract. And by filing the information on cross reference cards they can ascertain, for example, how many acres of 30-year-old pine or scrub oak Union Bag & Paper controls, or how many acres are in need of planting.

USING A MULTISCOPE, Walter Richter superimposes the aerials over a boundary line map. He then draws in on the latter the types of timber shown in the photo. The multiscope is a gadget similar to the once-popular parlor item, the stereoscope

West's Newsprint Use to Increase: Stanford U.

The western region of the United States and Canada will increase its consumption of newsprint by 29 per cent between 1954 and 1961, apparently becoming a "newsprint importer" by the latter date. These data were recently released after a prolonged study by the Stanford University Research Institute at the request of the California Newspaper Publishers Association.

The region under survey included the 11 western states, British Columbia, Alberta, Alaska and Hawaii. The report revealed that over the same period newsprint producers in the area plan a production increase of only 22 per cent.

Paper Firm Bankrupt

Paper Corp. of America, which operated a mill at Cheboygan, Mich., has been adjudicated bankrupt. The decision was given in New York federal court on a petition filed June 3, 1953.

Creditors are to be allowed until September 18 to file claims, according to a notice from Irwin Kurtz, referee in bankruptcy. Proceedings seeking the sale of the mill were dismissed February 11.

Francis Lindsay, Cheboygan city attorney, explained that mill assets will be liquidated. The U. S. Treasury Department has petitioned for a quick sale and will receive the major portion of funds received in settlement of back taxes.

Bowaters Southern Claims World's Newsprint Record

A world's newsprint speed record of 2118 fpm was established recently at the Calhoun, Tenn. mill of Bowaters Southern Paper Corp.

Heretofore, 32-lb. newsprint had not been produced at a speed in excess of 2015-2020 fpm. This record was established at a Canadian mill.

At Bowaters, the speed of No. 1 machine was increased from 1720 fpm

rough treatment today for better papermaking tomorrow . . .

This photograph shows felt samples being subjected to intensive wear in an abrasion tester at the Albany Felt Company laboratory. Although extremely important, abrasion testing is but a small part of the continuing research program at Albany Felt.

This research activity, centered in the mechanical and chemical laboratories, is supplemented by a Fellowship in a leading national research institute and field studies in cooperation with many paper mills.

As a result of this program, Albany Felt has been responsible for the introduction of many improvements in paper machine felts which have been directly translated into better and more efficient papermaking.

Notable among these accomplishments have been the development of synthetic content felts, patented in the U. S. and Canada by Albany Felt Company, and made available to other feltmakers through a nominal licensing fee. The famous Albany Felt J3 and W6 chemical treatments are other contributions from Albany research technicians.

That ***paper is our business, too,*** is the thought behind all of the research program at Albany Felt. Even today, work is in process on developments that are sure to mean better felts for better papermaking tomorrow! The goal, as always: MORE SALEABLE TONS PER DAY!

60 YEARS OF PROGRESS · 1895 · 1955 · ALBANY FELT COMPANY

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"World's Largest Manufacturer of Paper Machine Felts"

MAIN OFFICE AND PLANT, ALBANY 1, NEW YORK

Other plants: Hoosick Falls, N. Y.; North Monmouth, Maine; Cowansville, Quebec.

in the short period of three and a half hours. Company officials stated that operation continued efficiently at this rate, and that paper quality factors were particularly well maintained. According to a spokesman for Bowaters Southern, "this achievement confirms the feasibility of manufacturing newsprint in the speed range of 2000-fpm, and in the not too distant future — through the progressive refinements of operations and engineering improvements — this can become the ultimate goal of the newsprint industry."

The Calhoun newsprint machines were designed to Bowaters specifications and built by Beloit Iron Works.

St. Regis Experiments in Production of Fabric

St. Regis Paper Co. is experimenting with the application of papermaking principles to the production of fabric from DuPont's orlon, dacron and nylon. It is said that the fabric would be competitive with such textiles as silk, wool and cotton.

According to St. Regis, the objective is to produce a fabric from synthetic fibers in the same way that paper is made from wood pulp fibers —without first spinning the fibers into thread and then weaving the thread into cloth.

Utilization of this method of direct conversion may mark a further step in the paper industry's expansion into new markets. A report by DuPont scientists points out that, " . . . these papers represent potentially valuable products to further diversify the range of paper properties, and technological cooperation between papermakers and fiber producers will successfully solve the remaining production problems."

Paperboard Barometer Sees Fair Weather Ahead

For more than a quarter of a century economists have watched the output of paperboard as a key indicator of general business conditions in the United States. If it stays up, good business weather is in the offing. If it falters, storm clouds may not be far off.

Latest figures released by the National Paperboard Association bear a heavy note of encouragement. The NPA reports that output established successive production records during the first three weeks of March. Since the first of the year, production (some 3,000,000 tons) has surged 10 per cent ahead of a year ago and 5 per cent above the rate of early 1953—a year of record production. And producers are holding a fat order backlog that is on a par with that of mid-1953, when demand was sharpest.

Paperboard production has more than doubled since before World War II. In each of the last five years, board has accounted for more than 50 per cent of the tonnage of the domestic paper industry.

Ever Widening Use

Industry sources attribute part of the current production boom to the ever-widening use of paperboard. Nail manufacturers now ship more than half of their output in corrugated cartons. Lobster packers are using special corrugated containers for air freight, and paperboard pallets are replacing the wooden variety.

A number of firms have shared the rising fortunes of the paperboard industry. Heading the list in point of volume is the giant International Paper Co. Others include Union Bag & Paper Corp., Container Corp. of America, West Virginia Pulp & Paper Co., Robert Gair Co. Inc., Champion Paper & Fibre Co., Crown Zellerbach Corp., Continental Can Co., National Container Corp., Gaylord Container Corp., Federal Paper Board Co. Inc., and Mead Corp.

According to Alexander Calder, president of Union Bag & Paper, in the last 20 years (a period in which the population has risen 27 per cent), consumption of paperboard and coarse paper jumped from 85 lb. per person to about 200 lb.

News of the Industry . . .

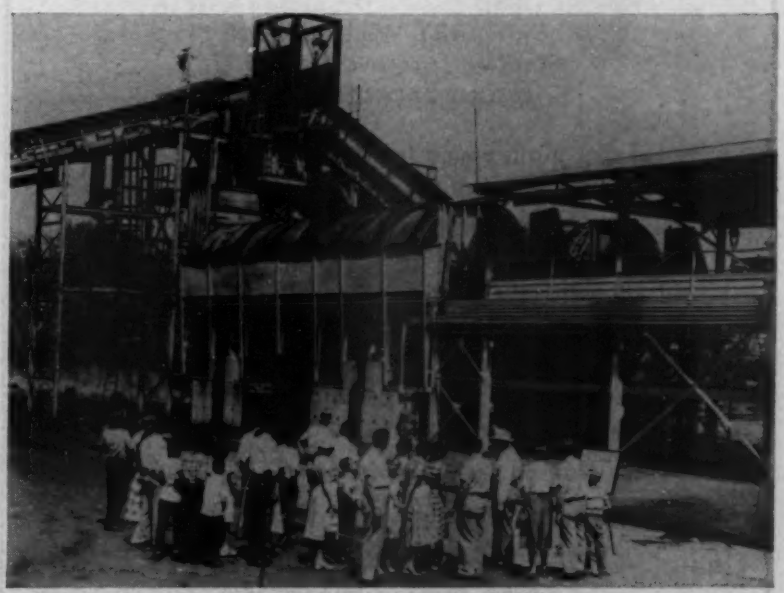
With forecasts of a U. S. population of 200,000,000 by 1975, Mr. Calder declares, "our population growth alone naturally assures substantial growth in the industry." He suggests, however, that if by the continued development of new uses "we can maintain or improve the dramatic increase in consumption of the last 20 years, the projected growth of paper products could become quite staggering."

Industry News Notes . . .

Empire Box Corp. has announced a corporate name change as follows: In Garfield, N. J., the new name is Coates Board & Carton Co. Inc.; in Stroudsburg, Pa., Coates Board & Carton Co. Inc. of Stroudsburg.

The Federal Trade Commission has officially dismissed charges brought nine years ago against **Crown Zellerbach Corp.** and two subsidiaries. The suit alleged illegal price discrimination.

Hinde & Dauch Paper Co. will close its strawpaper mill in Fort Madison, Iowa, June 30 for economic reasons. H&D has operated a mill in Fort Madison since 1920, when it



BARKING DRUMS and wood room interest a group of Open House guests during their recent tour through National Container Corp.'s newest kraft pulp, board and paper mill at Clyattville, Ga. Rated at 500 tons per day, the $25,000,000 plant has substantially exceeded its rated capacity

NEW FINISHING ROOM facilities at the Lock Haven, Pa. mill of New York & Pennsylvania Co. Included in the project that doubled the size of the area was a complete air conditioning system, a new cutter and trimmer, a Hayssen automatic wrapping machine and two Lynch wrappers. In addition, New York & Pennsylvania is widening the wire of its No. 5 paper machine to 116 in.

acquired control of Brown Paper Co. The present plant was erected in 1922.

Scott Paper Co. has established a $1000 scholarship at Colby College in Waterville, Maine honoring Michael Lester Madden of Boston, former board chairman of Hollingsworth & Whitney Co., now a Scott division. The scholarship will be awarded for the junior and senior years to a student planning on a business career.

PAPER AND PAPERBOARD MAKING

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Pocket size, cloth bound text book of 372 pages covering all phases of stock preparation and sheet formation including the fundamental principles of making paper on the fourdrinier machine and paperboard on the multiple cylinder machine.

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News of the Industry . . .

Alford Cartons of Ridgefield Park, N. J., has organized a new department, Packaging Research and Application, headed by William F. Wanner. The department will conduct concentrated research into the problems of merchandising packaged goods through all phases of wholesaling and retailing; particular emphasis will be placed on mass merchandising operations.

Although the corporate name will not be changed, the operations of **Kalamazoo Vegetable Parchment Co.** at its main plant in Kalamazoo and at the converting unit in Devon, Pa., are to be conducted under the name KVP Co. According to the firm, the longer name is a misnomer since production includes a wide variety of waxed, wrapping and fine papers.

PI Expansion Notes

Peavey Paper Mills Inc. of Ladysmith, Wis., will construct a 275-ft. mill addition to house a rebuilt paper machine recently purchased by the firm.

Robert Gair Co. Inc. stockholders have approved agreements providing for Gair's acquisition of Southern Advance Bag & Paper Co. Inc. and Great Southern Box Co. Inc. The action represents one phase of a large-scale expansion in the South. An $11,000,000 improvement program is being engineered at the Southern Advance mill in Hodge, La. The project will include the installation of a 246-in. high-speed bag paper machine that will operate at 2500 fpm and the conversion of an existing 242-in. machine to the production of semichemical corrugating material.

United States Gypsum Co. has awarded contracts to Black-Clawson Co. to supply all major board-making equipment that will be installed in USG's new Houston, Texas mill. Included will be a B-C eight-cylinder board machine and Shartle stock preparation equipment.

Crown Zellerbach Corp. will build a $750,000 green veneer mill in the Columbia River area near Portland, Ore. Marking C-Z's entry into a

phase of plywood production, the unit will produce an annual 87,000,000 ft. of 3/8-in. material. Chips from the mill may be used in paper production at plants in Camas, Wash., or St. Helens, Ore.

Canadian International Paper Co. has announced the acquisition of Hygrade Containers Ltd. of London, Ont. Hygrade's production consists of corrugated shipping containers on two machines. The firm will operate as a CI subsidiary. The acquisition marks CI's entry into the field of corrugated shipping containers.

Container Corp. of America is in production at its new corrugated and fiber shipping container plant in Los Angeles. Utilizing new high-speed equipment, the plant has a production capacity of 4,000,000 sq. ft. per day and is the largest of any of Container Corp.'s container-producing units. Chief production features are two corrugating machines, one 87 in. wide and 335 ft. long and the other 67 in. wide and 250 ft. long.

Compania Tecnica Cubana, S. A., has received a $5,000,000 loan from the Cuban government for the construction of a mill to manufacture bagasse pulp.

Fabricas De Papel Tuxepec, S. A. de C. V., will build a newsprint mill in Mexico. Operation is scheduled for the spring of 1957. Initial capacity will be about 33,000 tons. It is expected that at a future date the plant will add a chemical pulp mill utilizing Ponderosa pine.

W. R. Grace & Co. will spend $1,500,000 to expand by 50 per cent the production capacity of its pulp and paper mill (using sugar cane bagasse) near Lima, Peru. A new machine will be installed.

Orchard Paper Co. of St. Louis has purchased Racquette River Paper Co. of Potsdam, N. Y., for an undisclosed sum and will operate the firm as a wholly owned subsidiary under the name Racquette River Paper Corp. It is reported that more than $1,000,000 will be spent on plant improvements at Potsdam.

Bowater Corp. of North America Ltd. has announced the formation of Bowater Co. Ltd. to acquire and operate the hydroelectric development owned and operated by the parent firm's Bowater's Newfoundland Pulp & Paper Mills Ltd. The new concern will also have the right to acquire undeveloped water power rights owned by the Newfoundland firm. The value of the power rights acquired by the power subsidiary have been appraised at more than $34,000,000.

Coming Events

Tappi

July 10-23—Fourth Statistics Summer Course, U. S. Forest Products Laboratory, Madison, Wis.

Sept. 15-17—Fifth Fundamental Research Conference, Institute of Paper Chemistry, Appleton, Wis.

American Pulp & Paper Mill Superintendents Association

Sept. 16-17—Northwestern Division, Hotel Northland, Green Bay, Wis.

Sept. 22-24—Northeastern Division, Annual Meeting, Poland Spring House, Poland Spring, Maine

Other meetings

June 21-24—Forest Products Research Society, Ninth Annual Meeting, Seattle, Wash.

July 12-14—Second Plant Maintenance & Engineering Show, Pan Pacific Auditorium, Los Angeles

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ALLIED NEWS

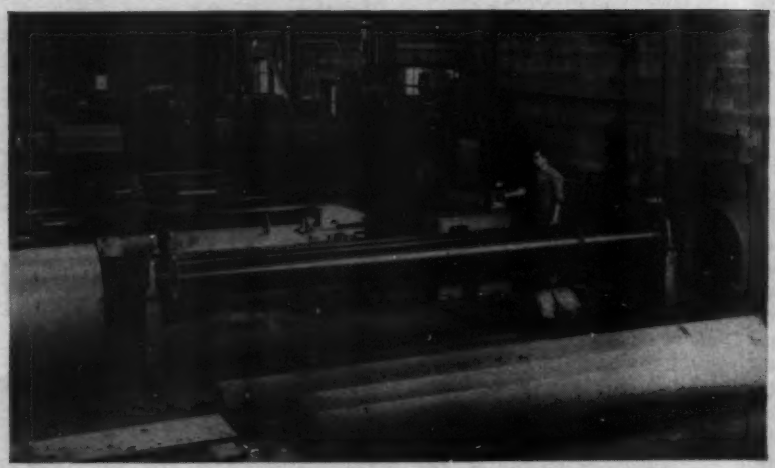
New Lindsay Plant

Lindsay Wire Weaving Co. of Cleveland has purchased a 35-acre site in Mentor, Ohio, where it will build a 45,000-sq. ft. plant. The operation, which will supplement Lindsay's two facilities in Cleveland, is to be constructed by Austin Co. At least 20 wire-weaving looms will be accommodated. (Mentor is 20 miles from Cleveland.)

B-C International Expands

The Black-Clawson Co. has announced that its British-European manufactory, Black-Clawson International Ltd., is expanding its manufacturing capacity and facilities in the supply of complete paper and board machines. The program also includes an increase in the present capacity for supplying a complete line of stock preparation and converting equipment.

The expanded facilities will include a new foundry and machine shop equipment to permit production of complete paper and board machines up to 300 in. face.



INSTALLATION OF another two-wheel grinder has been completed at the Neenah, Wis. plant of Raybestos-Manhattan Inc.'s Manhattan Rubber Div. The unit is designed to grind calender rolls of chilled iron, steel, brass, gunmetal, chromium, granite and wood. The grinders at Neenah will now handle the largest paper roll in use in the United States, while other facilities are provided for grit-blasting rolls in processing and dynamic balancing

Allied News Notes . . .

J. O. Ross Engineering Corp. has moved its Boston offices into much larger quarters, but at the same address, 79 Milk St., Boston 9. Additional personnel are being added to the sales force and the drawing room force.

National sales of Springfield water-tube package generators will be made through the Kewanee-Ross Boiler Div. sales offices, it was announced recently by Kewanee-Ross Corp. The new name for the product will be the Kewanee-Springfield water-tube package generator. It is available in 14 standard sizes from 6000 to 45,000 lb. steam/hr.

Norton Co. is equipping a plant at Santa Clara, Cal., for the manufacture of grinder wheels. Operation is expected January 1, 1956. Norton purchased the one-story plant, which is 45 miles south of San Francisco, last fall.

The consolidation of Hooker Electrochemical Co. and Durez Plastics & Chemicals Inc. has been formally approved by stockholder vote.

Koppers Co. Inc. has agreed to purchase all the outstanding capital stock of American Aniline Products Inc., fifth largest manufacturer of dyestuffs in the United States. It will be operated as a subsidiary with no change of name. American Aniline's one plant is at Lock Haven, Pa.

R. C. Ingersoll, president of Borg-Warner Corp., and E. S. Dulin, president of Byron Jackson Co., have recommended to their respective boards of directors that the two firms merge.

The new multi-million dollar Gibbstown, N. J. oxychemical plant of Hercules Powder Co. is now on stream, marking completion of a major step in the expansion and diversification program of the firm. The plant will produce phenol, acetone, alpha-methylstyrene, acetophenone and hydroperoxides.

Rhodia Inc. of New York, N. Y., has announced the appointment of the Naugatuck Chemical Div. of Dominion Rubber Co. Ltd. as sales and technical representative in Canada. Naugatuck maintains offices in Montreal, Toronto and Winnipeg.

Selas Corp. of America has started work on a $1,000,000 plant at Dresher, Pa. Selas develops, designs and manufactures high-speed heating and drying equipment for the paper and printing industries.

Nat. Starch Names Four Vice Presidents

National Starch Products Inc. has announced the appointments of Dr. Carlyle G. Caldwell, John F. Fitzgerald, Dr. Robert W. Merritt and S. F. Thune as vice presidents.

Dr. Caldwell, assistant vice president in charge of research since 1952, joined the firm in 1940. He has been a leader in the development of Amicoa. Mr. Fitzgerald, with National Starch since 1935, began his career as a technical salesman to the textile trade. He was made assistant vice president in charge of starch sales in 1953.

Dr. Merritt joined the firm in 1937. He served as plant superintendent in

"WORLD'S WIDEST" loom that was recently put into operation by F. C. Huyck & Sons at Rensselaer, N. Y., can accommodate felts for any paper machine now in use or in the planning stage. The 680-in. unit is capable of weaving felts up to about 340 in. in final width. All external drive gearing is fully enclosed in an integral gear unit to doubly guard against grease or oil splashes

Plainfield, N. J., until 1946, when he joined the New York manufacturing department. He was elected assistant vice president in charge of manufacturing in 1951. Mr. Thune has been with the company since 1934 and has held technical and sales assignments from coast to coast. In 1951, after serving as general manager of the Midwest Div., he was elected assistant vice president.

Allied Personalities . . .

Philip H. Goldsmith, former general sales manager for Pusey & Jones Corp., has been named sales manager of the Paper Machinery Div. of Dominion Engineering Works Ltd. in Montreal. An owner of many patents in the papermaking field, he joined P&J in 1939 to supervise the development and sale of cylinder and fourdrinier machines and accessories.

P. H. Goldsmith

A. J. Sigel

Arthur J. Sigel has retired as vice president of Gottesman & Co. Inc., wood pulp importers. He will remain with the firm as a consultant. Mr. Sigel joined the company in 1908 and was made vice president in 1926.

Dr. W. D. Thompson has been made sales manager for miscellaneous paper chemicals for the Paper Makers Chemical Dept. of Hercules Powder Co. For the past seven years he has been manager of the department's research section.

Edmund C. Paca has been named sales engineer in the South Central area for Albany Felt Co. He succeeds **Ray Dustrude,** now assistant sales manager.

Robert S. Stevenson, executive vice president of Allis-Chalmers Mfg. Co. since 1952, has been elected president to fill the vacancy created by the recent death of **William A. Roberts.** Mr. Stevenson joined the firm in 1933 as a salesman in the Kansas City branch.

PHOTOGRAPH OF the late Fred C. Boyce, for many years president of D. J. Murray Mfg. Co. of Wausau, Wis., was presented to the firm recently by an employee group. It is accepted here on behalf of the company by A. W. Plier, president, and F. C. Boyce, son of the late president and a director. Mr. Plier was reelected president at a recent directors meeting

V. Edwin Ware has been named sales engineer specializing in the plup and paper mill field for Warren Steam Pump Co. Inc. of Warren, Mass. He was formerly plant manager of the Wheelwright Div. of Doeskin Products Inc.

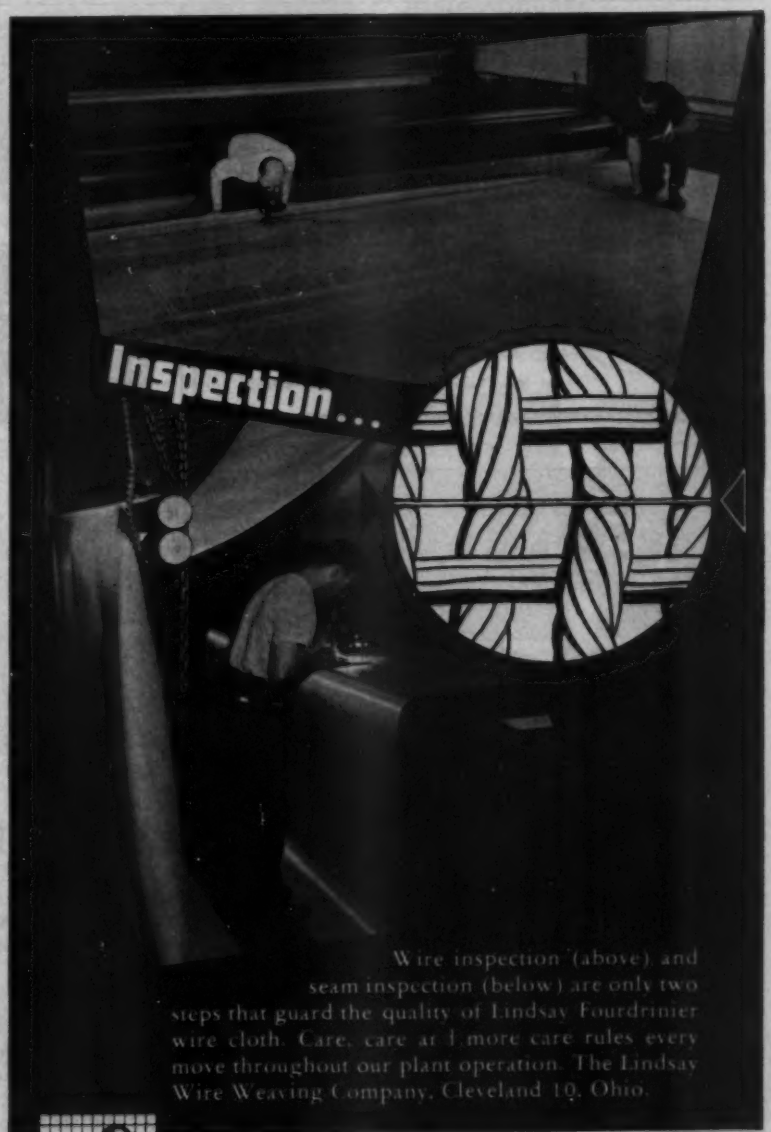
W. Chester Cobb, commercial vice president, has been named president of Arnold, Hoffman & Co. Inc. to succeed **Edwin H. Arnold,** who becomes chairman of the board. Mr. Cobb has been with the company since 1934. Succeeding him as commercial vice president is **Eric R. Herbertson.**

Arthur E. Maha has been named sales manager of the Link-Belt Co. Dodge plant in Indianapolis. Since 1948 he had been assistant sales manager of the plant, where L-B's complete line of ball and roller bearings are made.

David M. Forker Jr., executive vice president of the Wm. Powell Co. for two years, has been elected president to succeed **H. James Coombe.** Mr. Coombe was recently named board chairman.

Francis J. Merkt, who has been with the firm 17 years, has been appointed a sales representative for Downingtown Mfg. Co.

Harry Cubel has been named manager


Inspection...
Wire inspection (above) and seam inspection (below) are only two steps that guard the quality of Lindsay Fourdrinier wire cloth. Care, care at 1 more care rules every move throughout our plant operation. The Lindsay Wire Weaving Company, Cleveland 10, Ohio.
LINDSAY WIRES
Since 1904
FOR PAPER MANUFACTURING

Allied News . . .

of chain saw sales for the Atkins Saw Div. of Borg-Warner Corp. He was formerly a sales representative.

Edwin H. Ahlefeld Jr. has been made assistant general sales manager for Farrel-Birmingham Co. Inc. He joined the firm in 1945 and in 1950 was named manager of the Banbury mixer sales division.

George A. Baer has been named application engineer in the Valve Sales Div. of S. Morgan Smith Co. of York, Pa.

Paul Goldner, formerly with Jamar-Olmen Co., has joined the sales-engineering staff of J. O. Ross Engineering Corp. in New York. He will handle Ross systems and equipment in New York State.

Neil B. Conley has been appointed director of sales for the Organic Chemicals Div. of American Cyanamid Co. He has been assistant director since 1954.

National Aluminate Corp. has announced the promotions of three men to the post of vice president: **H. R. Powers,** Industrial Div. sales; **Gage Averill,** Catalyst Div. sales, and **Alphonso Cantalini,** European manager.

J. B. Sewell has been elected vice president of Garlock Packing Co. He joined the firm as a sales representative for Garlock Packing Co. of Canada Ltd. in 1935. In 1954 he was made general sales manager for the parent firm.

Melvin W. Pauly, formerly general sales manager, has been elected vice president in charge of sales for Lunkenheimer Co. **Harry A. Burdorf,** who in June will have completed 50 years with the firm, continues as vice president. **Chester C. Isekeit,** formerly treasurer and controller, was named vice president and treasurer.

David A. Stebenson has been placed in charge of the new San Francisco offices of Mason-Neilan Regulator Co., Boston manufacturer of industrial controls.

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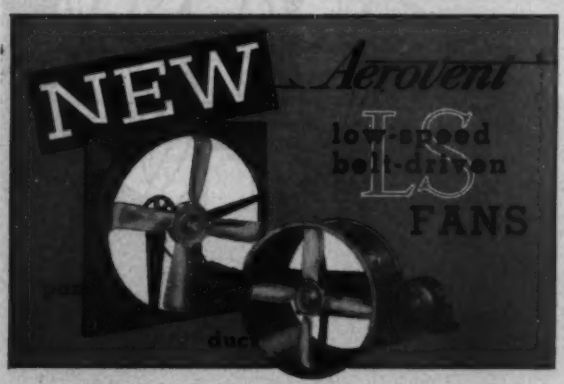


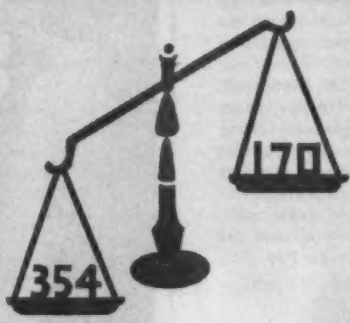
New Aerovent "LS" Belt-Driven Fans, designed with new 4-blade "Macheta" Airfoil Propellers, provide high-volume air movement with slower motor speeds and lower horsepower requirements.

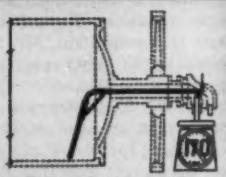
Available in sizes 24" to 48" for capacities to 31,800 CFM, they offer greater efficiency and economy against resistances to ¾" SP than direct-driven types operated at identical horsepower ratings.

write for free folder L-750

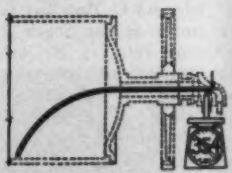
All Aerovent Fans are rated in accordance with the Standard Test Code and U.S.D.C. Comm. Std. CS178-51.

Aerovent Fan Company, Inc.
Ash and Blane Streets Piqua, Ohio





Reaction of ¾" Auto-Flex in 48" diameter dryer. Very low leverage.



Reaction of ¾" ordinary bent pipe syphon in 48" diameter dryer. Very high leverage.

A GLANCE
SHOULD CONVINCE

Ross Midwest Auto-Flex syphons have been on the market for years, thousands have been sold—and here's why.

The spring and brace hold the end of the pipe at the proper distance from the bottom of the dryer. It cannot possibly take any other position—hence, proper water and air removal.

The cantilever leverage exerted is lower than with bent pipe syphons. Only 170# vs. 354#. It clears instead of dragging on the journal—hence no wear on journal or pipe.

The Ross Midwest Auto-Flex fits all steam joints so order yours and quit worrying about syphon troubles.

ROSS MIDWEST FULTON CORP.
DAYTON, OHIO
A SUBSIDIARY OF J. O. ROSS ENGINEERING CORP.

NAMES in the NEWS

Hills Promoted at Martin

George B. Hills Jr. has been named executive vice president of Martin Paper Products Ltd., the corrugated container manufacturing division of Powell River Co. Ltd. He will headquarter in Winnipeg, Man., and have charge of operations in Winnipeg, Calgary, Edmonton and New Westminster, B. C.

Mr. Hills joined Powell River in 1950 as executive assistant following experience in the research and administrative phases of the United States pulp and paper industry. In 1954 he was named director of planning for the parent company and its subsidiaries.

Geo. B. Hills Jr.

John M. Fulton

C-Z Management Changes

Crown Zellerbach Corp. has announced management changes involving three of its Portland, Ore. area officials.

Frank A. Drumb, assistant vice president in Portland, has been named president of Canadian Western Lumber Co., an affiliate of Crown Zellerbach Canada Ltd. Succeeding Mr. Drumb is John M. Fulton, who will also continue to serve as director of purchases. And G. H. Gallaway, resident manager of the C-Z Camas, Wash. plant, has been elected a director of Western Transportation Co. and Waterway Terminals Co.—C-Z subsidiaries in Portland.

Mr. Fulton joined Zellerbach Corp. in 1928 shortly before it merged with Crown Willamette Paper Co. to form Crown Zellerbach Corp. Mr. Drumb became associated with the firm in 1927 following six years as assistant manager for Consolidated Water Power & Paper Co. in Wisconsin. In 1933 he became resident manager of the Ocean Falls, B. C. mill, in 1941 director of industrial and public relations at San Francisco, in 1947 resident manager at Camas, and in 1954 assistant vice president and corporate representative in the Pacific Northwest. Mr. Gallaway, who joined the firm in 1933 and served as resident manager in Lebanon, Ore., and Carthage, N. Y., will continue in his Camas position.

FIRST PERSON to reach 50 years' of company service in the New York, N. Y. office of Robert Gair Co. Inc. is Alfred Weigand (l), pictured with Charles Theobald, general traffic manager. Mr. Weigand joined the firm in 1905 as an office boy at Gair's Brooklyn plant. He has been in charge of former Gair plants in Rockford and Chicago, Ill., and is now in the general traffic department

First Woman Joins W. Michigan Staff

The addition of the first woman to the paper technology faculty at Western Michigan College in Kalamazoo has been announced by Dr. Alfred H. Nadelman, head of the department. She is Miss Carola Trittin.

Miss Trittin has been technical director of Ward Paper Co. in Merrill, Wis., since 1950, having joined the firm in 1947 as a research chemist. Following graduation from Lawrence College and studies at the Institute of Paper Chemistry and Northwestern University, she joined the staff of Hayton Pump & Blower Co. at Appleton. From 1928 to 1942 she worked in the laboratories of Appleton Coated Paper Co. Then followed three years as a senior research chemist for Container Corp. of America at Chicago and a year with American Coating Mills in Elkhart, Ind.

Whiting-Plover Appointments

Several changes in the executive officer alignment were made recently by Whiting-Plover Paper Co., Stevens Point, Wis.

To fill the vacancy created by the 1952 death of his father, Frank B. Whiting, George A. Whiting becomes chairman of the board. Thomas Leech, former vice president and general manager, succeeds Mr. Whiting as president and treasurer. John Hoerres, secretary, was also elected vice president. Thomas A. Moore is assistant secretary and treasurer.

F. E. Bahrenburg (above, l)

R. S. Young (above, r)

A. O. Spierling (right)

Hammermill Appoints Two to Supervisory Posts

Fred E. Bahrenburg has been appointed general superintendent and Robert S. Young superintendent of manufacturing for Hamermill Paper Co. in Erie, Pa.

Mr. Bahrenburg joined the firm in 1948 and shortly thereafter was named manager of the production department. Prior to his present promotion he was assistant general superintendent. Mr. Young has been with the firm 38 years. He was named assistant

Names in the News . . .

paper mill superintendent in 1945, superintendent of the finishing division in 1947, and assistant superintendent of manufacturing in 1952.

Coincident with Mr. Young's appointment is the retirement of Arthur O. Spierling, superintendent of manufacturing since 1942. He has been a member of the firm for 40 years.

St. Regis Promotes John McDermott

St. Regis Paper Co. has announced that John A. McDermott has become supervisor of all paper mills. He will continue temporarily as mill manager at Jacksonville, Fla.

Mr. McDermott joined St. Regis in 1928 and served at mills in Herrings and Oswego, N. Y., and Tacoma, Wash., prior to his 1952 transfer to Jacksonville.

Succeeding Mr. McDermott at Jacksonville is John M. Victor, Tacoma, Wash. paper mill superintendent. Stepping into Mr. Victor's post at Tacoma is Sidney T. Dolan, formerly assistant superintendent.

Haywood Promoted by West Virginia P.&P.

Gerald Haywood, director of the Luke, Md. research laboratory of West Virginia Pulp & Paper Co., has been promoted to the position of technical assistant to the director of technological research and development for the entire firm.

A veteran of 40 years in the West Virginia research department, Mr. Haywood holds a number of patents in the fields of pigments and machine coating of paper. As technical assistant to J. T. Walker, his duties will embrace all phases of the company's technological and research and development effort. He will be succeeded as director of the Luke laboratory by John G. Leech.

Chesapeake Names Two

Frank Barfknecht has been appointed paper mill superintendent by Chesapeake Corp. of Virginia to succeed the late Harry Rieck. The West Point, Va., firm named T. G. Hodges shift foreman, the position formerly held by Mr. Barfknecht.

The new paper mill superintendent has been associated with the firm since 1931, having previously been on the staffs of mills in Wisconsin, Minnesota, Oregon and Illinois. Since joining Chesapeake, he has been backtender, machine tender, shift foreman and since last July acting paper mill superintendent.

Mr. Hodges, the new shift foreman, also has been associated with the Virginia firm since 1931. He became a backtender in 1936, a machine tender in 1937 and acting shift foreman in 1954.

Karl Dammann has been named general manager of Paterson Parchment Paper Co. in Bristol, Pa. He was also reelected to the board of directors. Mr. Dammann joined the firm in 1918 in the maintenance department. In 1920 he was named master mechanic and in 1936 superintendent of maintenance and construction. In May of last year he was elected general plant superintendent.

Karl Dammann

P. H. Hershey

P. H. Hershey has been named technical director of P. H. Glatfelter Co. at Spring Grove, Pa. He was formerly head of the paper development group and more recently was acting technical director.

Mortimer J. Williams has been appointed products development manager for the boxboard division of Robert Gair Co. Inc. For the past four years he has been a salesman for the Tonawanda, N. Y., Boxboards Div.

M. J. Williams

Arnold Ginsberg

Arnold Ginsberg, assistant administrator of the Converting Plant Div., has been elected vice president of National Container Corp. and a director of the firm. A Cornell University graduate, he was previously technical director and assistant to the general manager of the Long Island City, N. Y., plant.

Leslie Christison, a research chemist, has joined the technical staff of Champion-International Co. in Lawrence, Mass. He was formerly with American Woolen Co.

L. Christison

J. E. Roddy

James E. Roddy, formerly with U. S. Corrugated Box Inc. at Louisville, Ky., has been appointed plant manager for the new corrugated box division of American Box Co. in Cleveland.

K. A. Miners has been appointed vice president of Great Lakes Paper Co. Ltd. He will continue to serve as secretary-treasurer of the firm.

Frank Kaulakis Jr. has joined the staff of Consolidated Water Power & Paper Co. as chief of coating development. Prior to his association with the Wisconsin Rapids firm, he was with Clinton Foods Inc. in Clinton, Iowa, and at one time was in the coating development department of S. D. Warren Co. at Cumberland Mills, Maine.

C. B. Davies has severed his connection with Irving Pulp & Paper Ltd. at Lancaster, N. B. He was mill manager and had formerly been on the staff of E. B. Eddy Co. at Hull, Que. He is a past chairman of the New York-Canadian Div. of the Superintendents Association.

Joseph H. Bach has resigned his position as superintendent of South Hadley Paper Mills Inc. of South Hadley, Mass. The firm was formerly the Pearl City Div. of American Tissue Mills. Mr. Bach has announced no further plans.

Ernest L. Alton, an employee of Knowlton Bros. Inc. for the past 27 years, has been named superintendent of the firm's Watertown, N. Y. plant. He succeeds the late Vernon C. Watters.

Necrology . . .

Carl Alwin Schenck

Dr. Carl Alwin Schenck, famous German forester who founded the first school of forestry in the United States, died May 16 in Germany at the age of 87.

Dr Schenck established the historic school in 1898 on the George W. Vanderbilt estate at Asheville, N. C. He had come to this country in 1895 to take charge of Mr. Vanderbilt's woodlands in North Carolina. In that position he succeeded Gifford Pinchot, who had been named chief forester for the federal government.

Following service with the German army during World War I, Dr. Schenck conducted forestry tours in Germany and Switzerland for American students, lectured at forestry schools in the United States, and served as a consultant.

Vernon Chase Watters

Vernon Chase Watters, 58, superintendent of mills for Knowlton Bros. Inc., died in Watertown, N. Y., May 4.

A native of Old Town, Maine, Mr. Watters had been a papermaker all his life. He was employed as a laborer by Eastern Mfg. Co. at Brewer, Maine, shortly after his graduation from high school. Subsequently, he was employed for 17 years as a machinist by Orono Pulp & Paper Co. He was next associated with Hollingsworth & Whitney Co. at Waterville as assistant superintendent; H&W later transferred him to its then new mill in Mobile, Ala., where he supervised the machinery set up.

On leaving Hollingsworth & Whitney, Mr. Watters became general superintendent of Gilman Paper Co. in Gilman, Vt., where he served from 1941 to the spring of 1950, at which time he became superintendent for St. Lawrence Paper Corp. in Norfolk, N. Y. He joined the Knowlton Bros. staff in 1951 as superintendent.

Samuel I. Aronovsky

Dr. Samuel I. Aronovsky, 54, of the United States Department of Agriculture's Northern Utilization Research Branch at Peoria, Ill., died recently. He headed the pulp and paper division of the Agricultural Residues Section.

Dr. Aronovsky was well known in the industry for his work in the development of improved pulping processes for straw.

Rated performance of every Nash Vacuum Pump is assured by this precise laboratory test

Rated capacities of Nash Vacuum Pumps are not theoretical. Every Nash Pump is tested individually. Air capacity is determined by delivery thru accurately machined and calibrated orifices. Related vacuum is measured by precise mercury column, and horse power is recorded electro-dynamically. Records of these tests are retained by us, and certified copies are available to Nash Pump owners.

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with this HUDSON-SHARP No. 2-RA Rotogravure Press

Designed for unusually accurate printing register of one to five colors at very high speeds on glassine, cellophane, film, laminated foils and a wide range of papers. Prints web widths of 20" minimum and 50" maximum with print repeats from 15" to 36". Each color unit is complete in itself and all units are mounted on a common base plate and connected by a single drive shaft. Simplicity of design makes the machine one of the simplest to operate — easiest to readily make quick change-overs and clean-ups. Passageway is provided between each color unit for similarly easy access to printing roll and doctor blades. The 2-RA features special re-circulating hot air drying units which adequately accommodate the machine's high speed operation. Rotary sheeter or folder can be added. Write for complete description — learn what this press can do for you in increased production and profits.

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Write for new brochure showing our complete line of machines for processing paper, film and foil products. No obligation, of course!

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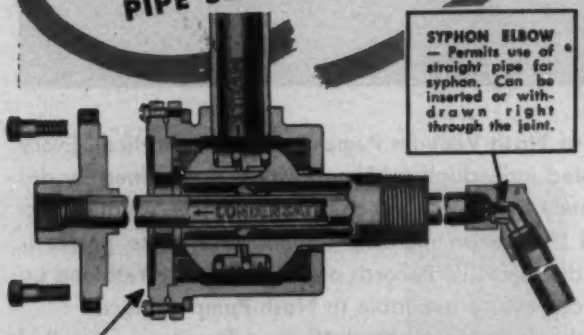
SYPHON ELBOW — Permits use of straight pipe for syphon. Can be inserted or withdrawn right through the joint.
ASSEMBLY PLATE— Holds internal parts of joint in position when head is removed.

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on this Type JP. Johnson Joints have written an unmatched service record . . . are first choice in mills all over the country . . . and can fit all operating needs.

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TANKS, CHESTS, LININGS
. . . any shape, any size

Engineered and erected by experts with over 25 years' practical experience. Highest quality glazed tile. Corrosion resistant, easy to clean, durable. For new construction or for remodeling existing facilities.

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627 HARRISON ST., KALAMAZOO, MICHIGAN

SAFETY NEWS

210 Firms Report Perfect Scores in First Quarter of NSC Contest

A 6-PER CENT rate reduction from the same period of last year has been reported during the first quarter of the 1955 Paper Industry Safety Contest sponsored by the National Safety Council.

For the three-month period, 210 of the 518 contestants maintained perfect scores. This compares to 197 for the same period in 1954.

The March frequency rate for all divisions was 6.66, while that for the first three months was 6.71, as compared to 7.10 for the January-March quarter of 1954. In the Pulp & Paper Div. the three-month rate was 6.49, down 5 per cent from a year ago. In paper converting the rate was 7.35, also down 5 per cent. In the Pulpwood Logging Div. the quarterly rate was 86.76, (this division was not in existence a year ago).

Perfect scores recorded for the January-March period were as follows:

Division I—Pulp and Paper Mills

Group A

Scott Paper Co., Chester, Pa.
Consolidated Paper Corp. Ltd., Wayagamack Div., Cap Madeleine, Que.
The Champion Paper & Fibre Co., Texas Div., Pasadena, Texas
Quebec North Shore Paper Co. Ltd., Baie Comeau, Que.
Nekoosa-Edwards Paper Co., Nekoosa, Wis.

Group B

P. H. Glatfelter Co., Spring Grove, Pa.
Price Bros. & Co. Ltd., Riverbend, Que.
Consolidated Paper Corp. Ltd., Belgo Div., Shawinigan Falls, Que.
Bathurst Power & Paper Co. Ltd., Bathurst, N. B.
Thilmany Pulp & Paper Co., Upper Mill, Kaukauna, Wis.
Container Corp. of America, Philadelphia
West Virginia Pulp & Paper Co., Tyrone, Pa.
Morris Paper Mills, Morris, Ill.
Camp Mfg. Co. Inc., Franklin, Va.
Paterson Parchment Paper Co., Bristol, Pa.
Fraser Companies Ltd., Edmundston, N. B.
Marinette Paper Co., Marinette, Wis.
Provincial Paper Ltd., Port Arthur, Ont.
National Container Corp., Valdosta, Ga.
Rayonier Inc., Jesup, Ga.
Crossett Paper Mills, Crossett, Ark.
Container Corp. of America, Fernandina Beach, Fla.
Simpson Paper Co. (formerly Everett Pulp & Paper Co.), Everett, Wash.
Rayonier Inc., Fernandina Beach, Fla.
Rayonier Inc., Port Angeles, Wash.
Marathon Corp., Rothschild, Wis.
Riegel Carolina Corp., Acme, N. C.

Group C

Chillicothe Paper Co., Chillicothe, Ohio
Schmidt & Ault Paper Co., York, Pa.
Escanaba Paper Co., Escanaba, Mich.
Container Corp. of America, Lake Shore Plant, Chicago
Fitchburg Paper Co., Fitchburg, Mass.
Neenah Paper Co., Neenah, Wis.
Manitoba Paper Co. Ltd., Pine Falls
West Virginia Pulp & Paper Co., Williamsburg, Pa.
Thilmany Pulp & Paper Co., Lower Mill, Kaukauna, Wis.
Falls Paper & Power Co., Oconto Falls, Wis.
Ste. Anne Paper Co. Ltd., Beaupre, Que.
Puget Sound Pulp & Timber Co., Bellingham, Wash.
Container Corp. of America, Wabash, Ind.
Price Bros. & Co. Ltd., Jonquiere, Que.
Consolidated Water Power & Paper Co., Wisc. River Div., Stevens Point, Wis.
Rising Paper Co., Housatonic, Mass.
National Vulcanized Fibre Co., Yorklyn, Del.
Riegel Paper Corp., Warren Mill, Riegelsville, N. J.
Johns-Manville Products Corp., Waukegan, Ill.
Fraser Companies Ltd., Newcastle, N. B.
The Mead Corp., Sylva, N. C.
National Vulcanized Fibre Co., Newark, Del.
Abitibi Power & Paper Co. Ltd., Fort William, Ont.
Charmin Paper Mills Inc., Division "B", Green Bay, Wis.
Weyerhaeuser Timber Co., Pulp Div., Springfield, Ore.
St. Regis Paper Co., Sartell, Minn.
John Strange Paper Co., Menasha, Wis.
Cornell Paperboard Products Co., Boxboard Mill, Milwaukee

Group D

Abitibi Power & Paper Co. Ltd., Sturgeon Falls, Ont.
Certain-Teed Products Corp., East St. Louis, Ill.
Container Corp. of America, Los Angeles
Strathmore Paper Co., Woronoco No. 2, Woronoco, Mass.
U. S. Gypsum Co., Oakmont, Pa.
Flintkote Co., Lockport, N. Y.
Congoleum-Nairn Inc., Cedarhurst, Md.
Certain-Teed Products Corp., Pryor, Okla.
New York & Pennsylvania Co., Willsboro, N. Y.
Certain-Teed Products Corp., Niagara Falls, N. Y.
The Mead Corp., Southern Extract Co., Knoxville, Tenn.
Container Corp. of America, Circleville, Ohio
National Container Corp. of Virginia, Big Island, Va.
The Mead Corp., North Leominster, Mass.
Container Corp. of America, Carthage, Ind.
Waterfalls Tissue Corp., Mechanic Falls, Maine
Ward Paper Co., Merrill, Wis.
Crown Zellerbach Corp., Lebanon, Ore.
Container Corp. of America, Ogden Div., Chicago
Coos Bay Pulp Corp., Anacortes, Wash.
Pollock Paper Corp., Waterproof-Ohio Div., Columbus, Ohio
Riegel Paper Corp., Hughesville Plant, Riegelsville, N. J.
Allied Chemical & Dye Corp., Barrett Div., Camden, Ark.; Peoria, Ill.; Dubuque, Iowa; Elizabeth, N. J.
The Philip Carey Co. Ltd., Lennoxville, Que.
Coos Bay Pulp Corp., Empire, Ore.
Celotex Corp., Los Angeles, Cal.
Central Fibre Products Co. Inc., Tama, Iowa
Celotex Corp., Metuchen, N. J.
Columbia Box Board Mills Inc., Chatham, N. Y.
Johns-Manville Products Corp., Pittsburg, Cal.
Bartgis Bros. Co., Ilchester, Md.
Strathmore Paper Co., Woronoco No. 1, Woronoco, Mass.
American Writing Paper Corp., Crocker Div., Holyoke, Mass.
Celotex Corp., Metuchen, N. J.

Group E

National Gypsum Co., Newburgh, N. Y.
Container Corp. of America, Tacoma
American Writing Paper Corp., Albion Div., Holyoke, Mass.
Canadian Johns-Manville Co. Ltd., Asbestos, Que.
Robert Gair Co. Inc., Wellsburg, W. Va.
Munroe Falls Paper Co., Munroe Falls, Ohio

(Continued on page 282)

Safety News . . .

Alton Box Board Co., Carlyle, Ill.
National Gypsum Co., Pryor, Okla.
Quaker Oats Co., Pekin, Ill.
Container Corp. of America, Wilmington, Del.
American Writing Paper Corp., Nonotuck Div., Holyoke, Mass.
Central Fibre Products Co., Denver
St. Regis Paper Co., Herrings, N. Y.
Container Corp. of America, Chattanooga, Tenn.
National Vulcanized Fibre Co., Marshall Bros. Div., Yorklyn, Del.
Celotex Corp., Avery, Ohio
Riegel Paper Corp., Riegelsville Plant, Riegelsville, N. J.
Flintkote Co., Mt. Carmel, Ill.
Logan-Long Co., Amalgamated Roofing Mills Div., Chicago
International Paper Co., Livermore Falls, Maine
Hammond Bag & Paper Co., Wellsburg, W. Va.
Spaulding Fibre Co. Inc., Hayes Plant, North Rochester, N. H.
U. S. Gypsum Co., Gypsum, Ohio
Johns-Manville Corp., Tilton, N. H.
Kimberly-Clark Corp., Kapuskasing, Ont.
Certain-Teed Products Corp., Marseilles, Ill.
Spaulding Fibre Co. Inc., Milton Plant, North Rochester, N. H.
International Paper Co., Riley, Maine
Celotex Corp., Madison, Ill.

Division II—Paper Converting

Paper Bags

St. Regis Paper Co. Ltd., Three Rivers, Que.
Bemis Bros. Bag Co., Mobile, Ala.
Crown Zellerbach Corp., Los Angeles, Cal.
St. Regis Paper Co., Playa Ponce, Puerto Rico
Thilmany Pulp & Paper Co., Kaukauna, Wis.
Pillsbury Mills Inc., Wellsburg, W. Va.
St. Regis Paper Co. Ltd., Vancouver, B. C.
St. Regis Paper Co., Los Angeles
St. Regis Paper Co. Ltd., Dryden, Ont.
Hammond Bag & Paper Co., Wellsburg, W. Va.

Boxes and Cartons

Group A

Container Corp. of America, 35th St. Plant, Chicago
National Container Corp., Long Island City, N. Y.
Container Corp. of America, Philadelphia
Container Corp. of America, Boston
Krafco Container Corp., West Monroe, La.
Robertson Paper Box Co. Inc., Montville, Conn.
General Foods Corp., Carton & Container Div., Battle Creek, Mich.
Fort Wayne Corrugated Paper Co., Chicago Div., Chicago
Brown Paper Industries Inc., West Monroe, La.
Container Corp. of America, Chattanooga, Tenn.
Bartgis Bros. Co., Ilchester, Md.
International Paper Co., Container Div., Chicago
Gaylord Container Corp., Dallas

Group B

Stone Container Corp., Chicago
Container Corp. of America, Philadelphia
Container Corp. of America, Oakland, Cal.
Gaylord Container Corp., Greenville, S. C.
Consolidated Water Power & Paper Co., Wisconsin Rapids, Wis.
Gaylord Container Corp., Atlanta, Ga.
Fonda Container Co. Inc., St. Albans, Vt.
Container Corp. of America, Valley Forge, Pa.
Container Corp. of America, Traver Div., Chicago
Container Corp. of America, Santa Clara, Cal.
Container Corp. of America, Philadelphia
Container Corp. of America, Cleveland
Northeastern Container Corp., Bradford, Pa.
Container Corp. of America, Sioux City, Iowa
Dairypak Inc., Cleveland
International Paper Co., Los Angeles
Container Corp. of America, Chattanooga, Tenn.
Gaylord Container Corp., Jersey City, N. J.
Container Corp. of America, Knoxville, Tenn.
Container Corp. of America, Muskogee, Okla.
Container Corp. of America, Baltimore
Bay West Paper Co., Green Bay, Wis.
Container Corp. of America, Los Angeles
Robert Gair Co. Inc., American Coating Mills Div., Grand Rapids, Mich.
Hoerner Boxes of Sand Springs Inc., Sand Springs, Okla.
International Paper Co., Wooster, Ohio
Fort Wayne Corrugated Paper Co., Rochester, N. Y.
Gaylord Container Corp., Houston, Texas
Bradley & Gilbert Co., Louisville, Ky.
Container Corp. of America, Seattle
Hoerner Boxes of Fort Worth Inc., Fort Worth, Texas
International Paper Co., Kansas City, Kan.
Container Corp. of America, Boyle Ave. Plant, Los Angeles
Container Corp. of America, Boston
International Paper Co., Springhill, La.
Mott Carton & Paper Co., St. Louis
Container Corp. of America, Greensboro, N. C.

Roofing Paper

Flintkote Co., East Rutherford, N. J.
Ruberoid Co., Joliet, Ill.
Flintkote Co., Chicago Heights, Ill
Ruberoid Co., Gloucester, N. J.
Ruberoid Co., Erie, Pa.
Johns-Manville Products Corp., Marrero, La.

Greater Production of Higher Quality Pulp

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Chemipulp Process Ltd., 403 Crescent Bldg., Montreal

West Coast
A. H. Lundberg
Orpheum Bldg., Seattle

Lundberg-Ahlen Equipment Ltd.
146 E. Broadway, Vancouver

Certain-Teed Products Corp., Dallas
Flintkote Co., Portland, Ore.
Bird & Son inc., Chicago
Certain-Teed Products Corp., Kansas City, Mo.
Ruberoid Co., Baltimore
Ruberoid Co., Minneapolis
Pabco Products Inc., Emeryville, Cal.
Pabco Products Inc., Portland, Ore.

Insulation and Building Board

Minnesota & Ontario Paper Co., Insulite Div., International Falls, Minn.
National Gypsum Co., Mobile, Ala.
Southern Johns-Manville Products Corp., Jarratt, Va.
Armstrong Cork Co., Macon, Ga.

Specialties

Canadian Cellucotton Co., Niagara Falls, Ont.
Crown Zellerbach Corp., San Leandro, Cal.
Orchard Paper Co., St. Louis
Old Colony Envelope Co., Westfield, Mass.
Marinette Paper Co., South Glens Falls, N. Y.
International Paper Co., East Point, Ga.
Scott Paper Co., Sandusky, Ohio
International Paper Co., Kansas City, Kan.
Container Corp. of America, Piqua, Ohio
Line Material Co., Sherman, Texas
International Paper Co., Norristown, Pa.
Container Corp. of America, Portland, Ore.
Mid-West Wax Paper Co., Fort Madison, Iowa
Waterfalls Tissue Corp., Mechanic Falls, Maine

Division III—Pulpwood Logging

None

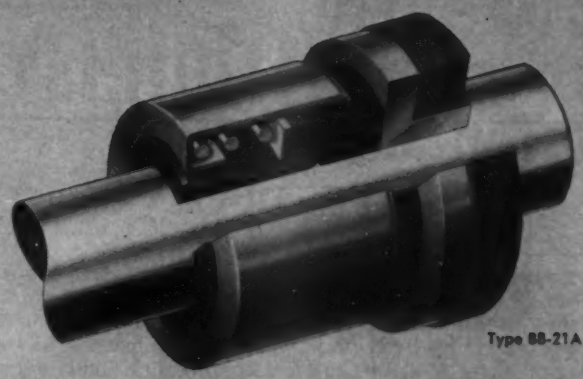
Safety News Notes. . .

Rayonier Inc.'s Jesup Div. in Georgia has completed its first year of operation and is believed to have set a new safety record for a mill start-up. According to Thomas R. Stein, resident manager, the plant has operated almost 1,000,000 man-hours with but three disability injuries. This is 60 per cent better than the national average for pulp and paper mills, he said, and is most unusual for a mill in its first year of operation.

Michigan Paper Co. at Plainwell, Mich., has been cited by American Mutual Liability Insurance Co. for a total of 582,925 man-hours during 1954 without a lost-time accident.

The National Safety Council has announced that its Home Safety Conference is requesting that all firms with off-the-job safety programs submit summaries of those programs. Such reports will be incorporated in a booklet that will be distributed to all participants.

GARLOCK MECHANIPAK SEAL



Type 88-21A

for Rotating Pump Shafts at pressures up to 150 p.s.i.

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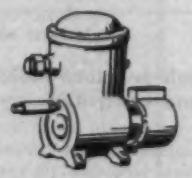
The Garlock BB-21A MECHANIPAK Seal, proven in service on thousands of water pumps, provides a low cost *leakless* seal.

IMPORTANT FEATURES



This MECHANIPAK Seal occupies a very small space—specifically designed for rotary pump shafts. It comes completely assembled, ready to install. Standard construction includes brass shell, brass washer and Buna-N bellows. Other materials available. Furnished for shafts from ⅜" to 3" diameters.

SAVE 3 WAYS

Customers tell us the MECHANIPAK Seal *pays for itself.* (1) Reduces maintenance costs (2) Absolutely no shaft wear (3) Cuts down time.

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GARLOCK

PACKINGS, GASKETS, OIL SEALS

MECHANICAL SEALS, RUBBER EXPANSION JOINTS

PATENT REVIEWS

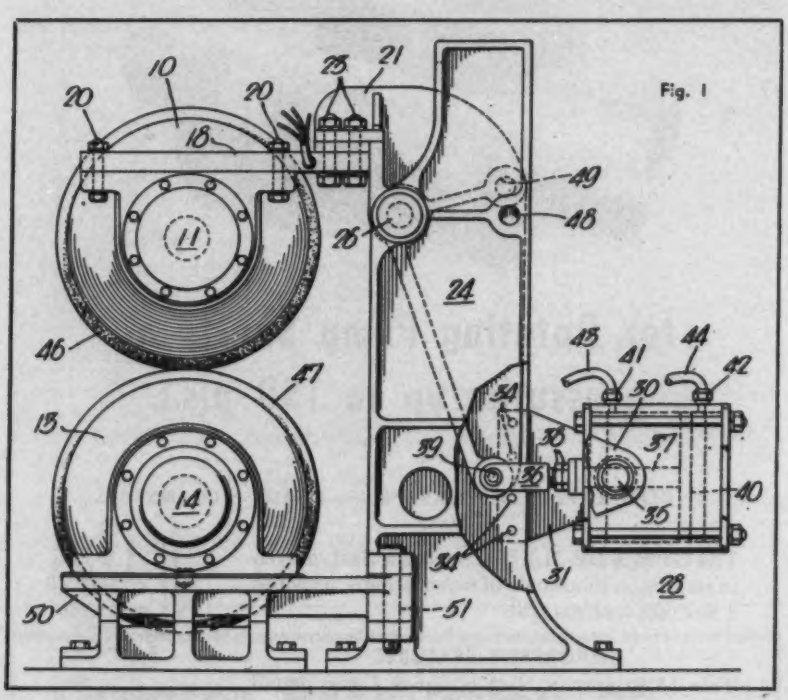


Fig. 1

MELVIN NORD*

Roll pressure indicating and controlling system

In order to obtain the best results in the papermaking art, it is essential to determine accurately the pressure applied between the various rolls of machinery and to provide means for maintaining the desired pressure. Not only is it important that the pressure between the tools (nip pressure) be kept constant, but the pressure at each end of the rolls must be equalized within fairly close limits.

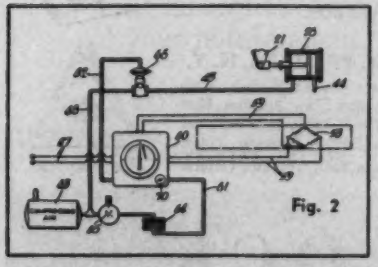


Fig. 2

The proper control of nip pressures has a very substantial bearing upon the quality and cost of the product. In the first place, uneven pressure across the face of the rolls greatly decreases the life of felts due to the increased frictional wear. Secondly, since the cost of removing water in the dry section greatly exceeds the cost of removing water in the wet section, the proper control of nip pressures throughout the drying process insures that maximum drying is taking place at all times. Constant pressures along the roll insure maximum production of a uniform product.

U.S. 2,691,326, issued Oct. 12, 1954, to Theodore A. McArn and assigned to Downingtown Mfg. Co., provides an accurate electrical strain gauge for indicating and recording roll nip pressures, as well as a control system which is extremely sensitive and quickly responsive to pressure variations. Strain gauges are placed at each end of the roll and separately connected to pressure indicators, which in turn automatically control the nip pressure at each end of the roll.

Fig. 1 shows an end view of a pair of press rolls and supporting stands on which the system has been mounted, and Fig. 2 is a schematic diagram of the control and indicating system.

A cylinder similar to 28 is mounted at each end of the rolls. A piston 40 within the cylinder is attached to the end of rod 37, and its position is controlled by fluid introduced through lines 43 and 44. Movement of the piston pivots arm 21 on pin 26 to control the nip pressure between the felt peripheries 46 and 47 of the rolls.

Referring to Fig. 2, leads 59, 59 are connected to the strain gauge element of the load beam at one end and to a combined indicating and recording device 60 at the other end. The indicating and recording regulator 60 is in turn associated with low-pressure conduits 61 and 62, the former of which leads to a supply 63 of high pressure fluid, such as air, through filter 64 and reducing valve 65. The other line 62 connects regulator 60 to an automatic diaphragm-type metering valve 66. Regulator 60 is attached to a suitable source of electrical power by means of leads 67, 67, and the cylinder assembly 28 is connected to the source of compressed air 63 by means of high-pressure conduits 43 and 68 on either side of valve 66. The regulator 60 may be adjusted by means of a knob 70 so that when the pressure in the cylinder 28 falls below a predetermined value, valve 66 will be automatically opened to admit additional pressure to the cylinder 28 from tank 63 through conduits 68 and 43. In this way, both accurate nip pressure readings and automatic corrections are obtained.

Conduit 44 is connected to any source of high pressure such as tank 63 by suitable conduits and valves (not shown) and is used only to raise upper roll 10 when it is desired to change or remove felts.

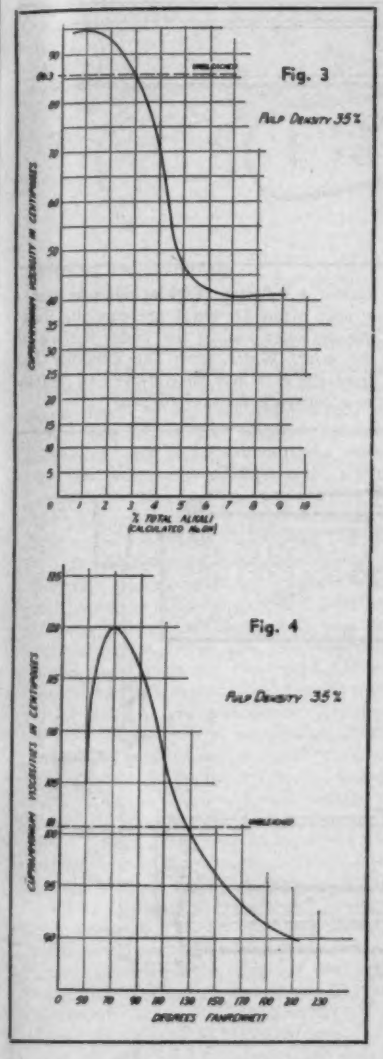
Treatment of unbleached sulfite pulp

U.S. 2,692,181, issued Oct. 19, 1954, to Robert L. Mc Ewen and Fred R. Sheldon and assigned to Buffalo-Chemical Co., relates to a single stage process for treating unbleached sulfite wood pulps to achieve moderate to high brightness fibers which possess unimpaired or improved physical properties such as tensile strength, burst, tear, and cupranimonium viscosity.

Other Patents of Interest to the Pulp and Paper Industry

Subject	Inventor or Assignee	Patent No.	Date
Production of paper bags	Bischoff & Klein	2,690,706	10/ 5/54
Roll pressure indicating and controlling system	Downingtown Mfg. Co.	2,691,326	10/12/54
Log barge	Ludwig S. Baier	2,691,355	"
Apparatus for stripping bark	Board of Control of the Michigan College of Mining & Technology	2,691,395	"
Paperboard box structure	Atlanta Paper Co.	2,691,471	"

*Patent attorney, 17600 Pinehurst, Detroit 21



The process involves treating the pulp with a minimum of peroxide and attendant alkali and peroxide stabilizer, under conditions where the physical and chemical damage to the pulp is at a minimum. These conditions are obtained at a high pulp density during the bleach, preferably in the range 25% to 65%. As shown by Fig. 3, only that quantity of alkali should be employed as is required to produce the alkaline environment required for the peroxide bleach and substantially no excess, as excess of alkali reduces the cupranimonium viscosity in the resultant bleached sulfite pulp. Also, as shown in Fig. 4, when the temperature of the bleaching mass of fibers is raised to 150 or 180°F., the pulp damage is greatly increased when a specified amount of alkaline peroxide is used.

Digester filling chute

In the manufacture of paper pulp, difficulty is experienced in completely filling the digesters. Wood chips have a tendency to build up in conical form, leaving void spaces near the top of the digester. It is usually necessary for a workman to enter

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FERROLITE COLORS are Red, Brown, Green, Gray and Black.

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QUALITY CONTROL—Fulton Asphalt Co., specialists since 1870 in quality flooring, has built a special laboratory to insure quality control and uniformity of Ferrolite.

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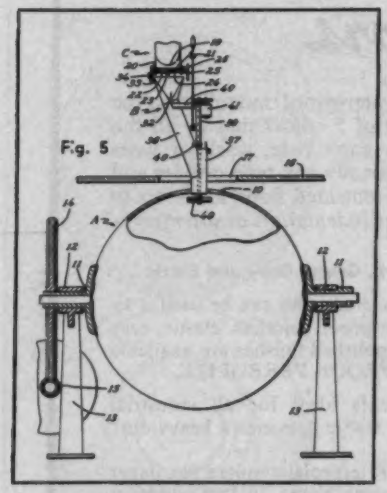
the digester and shovel the clips laterally in order to fill the digester completely. In some cases, it has been found necessary to close the digester opening, rotate the digester for a while to scatter the chips, and then open the digester to fill the remaining space with chips. Such procedures are costly and time-consuming.



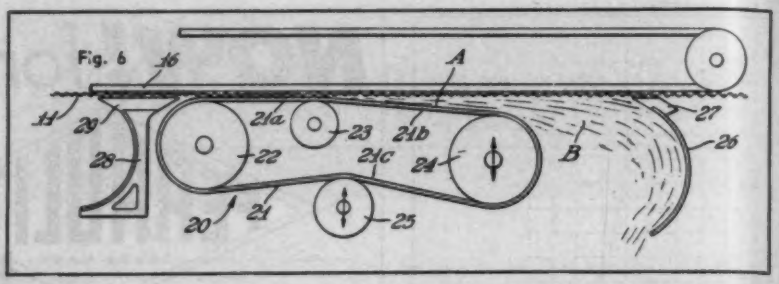
In U.S. 2,696,904, issued Dec. 14, 1954, to Nels H. Sandberg and assigned to Waldorf Paper Products Co., a chute is provided for guiding wood chips from a lateral conveyer to the digester opening. As shown Fig. 5, the chute B is provided with a rotatable paddle wheel 49, which scatters the chips in all directions from the lower end of the chute, thereby eliminating the difficulties described above.

Water removal device for paper forming wire

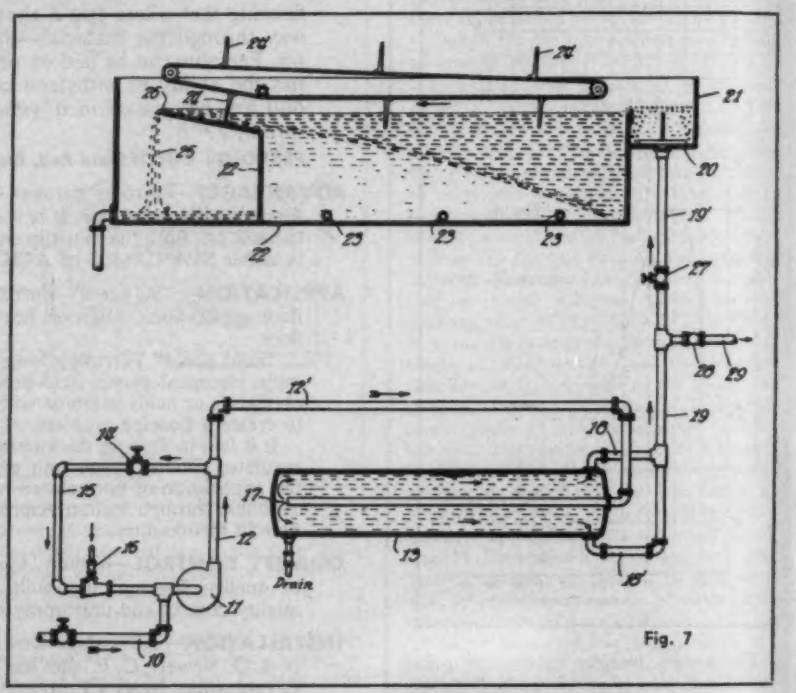
U.S. 2,694,345, issued Nov. 16, 1954, to Lloyd Hornbostel and assigned to Beloit Iron Works, uses an additional device along the upper wire run of a fourdrinier machine in advance of the suction boxes to aid in the removal of water from the wire, thus preventing the flooding of the initial suction boxes.

The apparatus is shown in Fig. 6. It consists primarily of an endless belt 21 of rubber sheeting extending below the forming wire. The belt is trained about a large guide roll 22 and a small guide roll 23 so that the oncoming reach 21a of the belt contacts the under surface of the forming wire 11. After passage of the belt over the guide roll 23, the belt is trained about an additional large guide roll 24, so that the offgoing reach 21b of the belt is inclined away from the under surface of the wire. A return reach 21c of the belt from the guide roll 24 to the initial guide roll 22 is deflected by means of a tension roll 25 outside the loop of the belt. The rolls 24 and 25 are adjustable vertically.

The initial reach 21a of the belt forms



a bottom for the wire, and as this bottom is pulled away from the wire along the downwardly inclined reach 21b, a suction is created below the wire, causing drainage of water from the wire. The drained water runs down the belt and is flung tangentially against a deflector 26, which has an upper scraper blade 27 which prevents the flinging of water against the under surface of the wire. Water from the deflector and from the belt may be conveyed by gravity to a conventional save-all pan.



Removing dirt from wood pulp

U.S. 2,697,384, issued Dec. 21, 1954, to Kenneth A. Craig and Charl Louis Roux de Wet and assigned to Paper Patents Co., describes a process for removing dirt from mechanical or groundwood pulp. The difficulty of separating encased bark and knots from sound wood results from the fact that the densities are all virtually identical.

The process is based on the discovery that in a dilute aqueous wood pulp, and particularly a groundwood pulp suspension, finely divided air bubbles are selectively attached to the pulp and not to dirt specks. The occlusion of the bubbles on the pulp is adequate to float the pulp to the surface of the suspension.

The process is illustrated in Fig. 7. An aqueous slurry of unbleached poplar groundwood at about 0.25% consistency and contaminated with bark and knot dirt specks enters the system through pipe 10 and is pumped continuously by pump 11 into a 10-gal. retention tank 13, where it is maintained at a pressure of 80 psi for about 1.5 minutes. Air is injected into the stock at a rate of about 0.15 ft./min. by means of a venturi 16 in recycle line 15. As the stock enters the retention tank at one end and leaves at the other end there is little or no channeling. The rate of flow is about 6.5 gals./min., which is adequate to keep the stock under pressure in the tank for about 1.5 minutes.

The stock then flows through an inlet disc valve or orifice 20 into a chamber 21, where the pressure is reduced to atmospheric. This results in the release of a large number of extremely fine bubbles of air. The aerated stock then flows into a flotation chamber or settling basin 22 equipped with a constant level device (not shown) for removing clarified water and dirt from the bottom 23. The flotation chamber is also provided with slowly moving skimming or scraper blades 24 for removing the pulp 25 which rises to the top. The clean pulp as it leaves the settling basin at 26 is at a consistency of about 2.33% and is ready for the manufacture of high-grade papers.

FOREIGN ABSTRACTS

Effects of beating on straw pulps

Three pulps are prepared from straw by the neutral semichemical sulfite, kraft, and Celdecor processes and are then bleached. Despite showing marked analytical differences from pulps made from wood, the straw pulps show very similar mechanical properties and brightness to those shown by the wood pulps; only their tearing strength is lower. Their performance on the paper machine is also quite similar to that of the wood pulp.

Laboratory beating studies (using a beater, a Lampén mill and a small Jockro mill) indicate that when wood pulp and straw pulps are beaten separately to a certain degree of beating, the time required is longer than when the two pulps are first mixed and then beaten. The strength properties of the resulting sheets are very nearly proportional to the composition of the furnish. The behavior of straw pulp on beating depends on the pH in the suspension. Thus, to reach a specific degree of beating, a much longer time is required at pH 4.5 than at pH 6-7. At the lower pH, the straw pulp fiber length decreases more rapidly than at neutrality. Beating at pH 4.5 leads to a slower increase in folding endurance. As shown by phase contrast photomicrographs, the parenchyma cells of straw pulps are torn, even at the early stages of the beating operation. G. van-Nederveen and G. H. Hellenberg, *Das Papier*, 9, 1-6 (1955) (in German).

Concepts of industrial instrumentation in Finland

The article gives the Finnish equivalents for many important ideas on the techniques of industrial instrumentation and formulates examples with suitable figures.

A feature of this article is a preliminary series of suggestions for a Finnish instrumentation *vocabulary*, given in tabulated form, with full definitions, together with the corresponding terms used in Sweden, Germany, England and the United States. As an example, the Finnish term "Säätöpiiri" is the equivalent of the "automatiskt reglerings system" (used in Sweden), "Regelkreis" (used in Germany), and "automatic control system" (used in England and the U.S.).

The object of the paper is to permit non-experts to familiarize themselves with the field and to gain greater precision in handling instrumentation problems. Harry Raaste, *Paperi ja Puu* (*Paper and Timber, Finland*), 36, 417-26 (1954) (original in Finnish, with English summary and glossary in Swedish, German and English).

Fig. 1—Ruins of the Darmstadt Institute in World War II

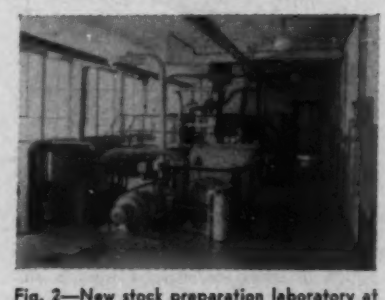


Fig. 2—New stock preparation laboratory at Darmstadt

Fiftieth anniversary of paper engineering courses at Darmstadt

The author gives a brief description of the development and the leadership in paper technology at the engineering school at Darmstadt. After widespread destruction in World War II (cf. Fig. 1), the Institute was completely rebuilt and largely refurnished with modern equipment. This is illustrated, in part, in Fig. 2, which shows the stock preparation laboratory. Claus Globig. *Wochbl. Papierfabrik.*, 83, 247-50 (1955) (in German).

Moisture in wood pulps

The American boring method for sampling pulp bales is compared with the wedge method used in England and the Scandinavian countries, and the moisture in the respective samples is determined. The moisture gradient, both in the horizontal and vertical directions, is sufficiently great so that the boring method of sampling is not really representative of the per cent of water in the pulp, being biased in favor of the outside of the bale. Thus, this method gives results that are consistently lower than those obtained when wedge samples are taken. The time required in obtaining wedges is reduced (without sacrifice of accuracy), and this method is recommended.

The authors also describe pulp drying ovens in which the hot samples can be weighed and in which the temperature range between the top and bottom of the oven is only 1.5°. D. E. Davis and A. I. M. Rodger, *Australian Pulp & Paper Ind. Tech. Assoc. Proc.*, 7, 213-232; discussion, 232-238 (1953).

Biochemical experiments with spent sulfite liquors

It was found possible to culture species of *Aspergillus, Penicillium* and *Rhizopus*, in the presence of air, in spent liquors diluted 1:1 and admixed with small amounts of inorganic nutrients (*e.g.*, 400 mg. $NaNO_3$ and 200 mg. KH_2PO_4 per l.). Most of the added phosphate and much of the nitrogen are found in the mold that has been grown in this fashion. The major portion of the phosphorus and about one-third of the nitrogen can be recovered from the mold substance by treatment with aqueous acids at room temperature, and most of the nitrogenous material can be dissolved out with dilute mineral acids at the boiling point. The growth of such molds greatly diminishes the biological oxygen demand of the spent sulfite liquors, and it is this demand that is known to be the principal cause of pollution troubles in streams into which those liquors are emptied.

The mold substance contains some proteinlike material which is readily hydrolyzed, and the dry substance may contain over 5 per cent nitrogen. Apparently, the molds, in developing, utilize those portions of the lignin that are of low molecular weight. At least one type of washed mold substance cultured in fermented spent liquor gives rise to appreciable amounts of an acid-insoluble fraction resembling "Klason lignin," and, in contrast to the dry matter from other microorganisms, contains over 8 per cent methoxyl. Similarly, when a sodium lignosulfonate solution is prepared from the isolated β-napthylamine salt of lignosulfonic acid, a certain amount of mold growth is also observed in this solution.

When a kraft black liquor is treated with air at about 90°C, acidified and filtered, this, too, permits the growth of the molds. The latter is also cultured in mix-

tures of kraft black liquor and fermented sulfite spent liquors (properly treated).

Protazoa (*Oxytricha*), found in the active sludge from a biological water purification plant, can actually be grown on undiluted fermented spent sulfite liquor, provided the proper nutrients have been added and air is present. On the other hand, white rot fungi requires the addition of carbohydrates to the fermented spent liquor before these organisms can grow. Thirty-five references. Terje Enkvist and Carita Backlund. *Paper and Timber* (Finland), 37, 53-60 (1955) (in Swedish, with English summary).

Behavior of pulps and linters in aqueous sodium hydroxide

Cotton linters (L) (containing 99.2 per cent alpha cellulose), bleached hemlock sulfite pulp (S) (containing 96.7 per cent alpha), and bleached hardwood kraft pulp (K) (containing 93.4 per cent alpha) are treated in a series with gradually increasing concentrations of NaOH (from 1 per cent up to 15.6 per cent) at 0-3° C. The treated fibers are then washed successively with water, 2 per cent acetic acid, and water, and dried *in vacuo* over $CaCl_2$. They are then examined by X-ray diffraction methods and by water sorption at 23° C. and 50 per cent relative humidity. The results are shown respectively in Figs. 1 and 2.

Confirming B. G. Ranby's observation (dissertation, Univ. Upsala, 1952), it is found that the so-called cellulose "crystallinity" decreases as the concentration of the alkali increases up to a point at which a certain transition phase begins. Thereafter, the change of Cellulose I into Cellulose II proceeds further with increasing NaOH concentration. The transition phase occurs earlier with pulps S and K than with cotton linters.

The authors postulate the following: Cellulose I is converted into Soda-Cellulose I in two stages, the first of which is reversible, thus permitting some Soda-Cellulose to be formed at a relatively low alkali concentration when the cellulose "strings" are narrow or imperfectly formed and have a large effective area and a high surface energy per unit mass. At a certain stage the reaction becomes irreversible; and, subsequently, on washing, the Soda-Cellulose passes into Cellulose II. Judged on this basis and from Ranby's measurements, it appears that the crystallites with the largest effective areas exist in sulfite pulp (S), with somewhat less effective areas in (K), and the smallest in the linters.

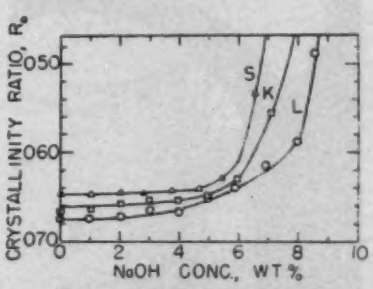


Fig. 1—Crystallinity ratio of celluloses treated with various concentrations of sodium hydroxide: (S) sulfite cellulose, (K) kraft cellulose, (L) cotton cellulose

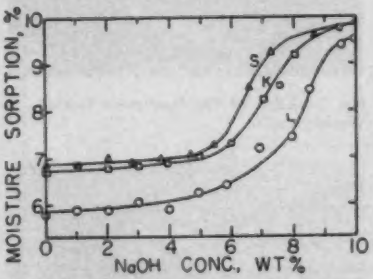


Fig. 2—Moisture sorption of celluloses treated with various concentrations of sodium hydroxide: (S) sulfite cellulose, (K) kraft cellulose, (L) cotton cellulose

Also, there is a relatively narrow distribution in crystallite effective areas in sulfite and in linters, with a broader distribution in kraft pulp. Eleven references. Ole Anker-Rasch and J. L. McCarthy. *Norsk Skogind.*, 8, 329-333 (1954) (in English).

Semichemical and high yield pulps

The classification of these pulps is evidently made on the basis of yields. Those termed "semichemical pulps" are obtained in yields of over 65 per cent. The "high yield pulps" are those within the yield range of 54-65 per cent, whereas "normal pulps" are those obtained in yields below 54 per cent.

Mill scale cooks and refining of semichemical pulps are reviewed. The author gives the results of various experimental cooks on pine and spruce and on birch and aspen and records (graphically) yields, screenings, per cent of residual lignin in the pulp, breaking length, and folding endurance. N. A. Rozenberger. *Bumazh Prom.*, 29, No. 11, 5-9 and No. 12, 8-12 (1954) (original in Russian); through *C.A.*, 49, 5834 (1955).

Irregularities in sulfite pulping revealed by staining methods

As revealed by some excellent colored photomicrographs, staining with malachite green and with p,p'azo-dimethylaniline serves to emphasize certain irregularities in the sulfite cook. The two stains, however, act differently. Whereas malachite green stains *all* types of lignin and lignified tissues, p,p'azo-dimethylaniline stains only sulfite pulps (*i.e.*, lignosulfonates) and leaves all other forms (such as unbleached kraft pulp) unstained.

The fact that a sulfite pulp may not be equally delignified throughout its mass is clearly shown by either malachite green or p,p'azo-dimethylaniline. For example, a sulfite pulp retaining 1.18 per cent lignin, when examined by the staining reaction, is shown to contain 73 per cent *unstained* fibers. Thus, p,p'azo-dimethylaniline is valuable in detecting irregularities in sulfite pulping. The fibers that are least delignified stain the most heavily, and the various stained fibers can be grouped together and classified according to intensity of staining. By counting the numbers of these variously stained fibers in a pulp mixture, it is possible to quantitatively determine the "cooking irregularities." The rate of lignin removal from the fiber, and just where the delignification begins, can also be followed

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by the staining reaction. The authors discuss this in some detail.

Similarly, the progress of a bleaching operation can be closely followed. In coniferous tracheids, the delignification begins at the fiber ends and then proceeds gradually to the central portion of the fiber. The lignin isolated from sulfite pulps still retains a structure, whereas that from kraft pulps is completely structureless.

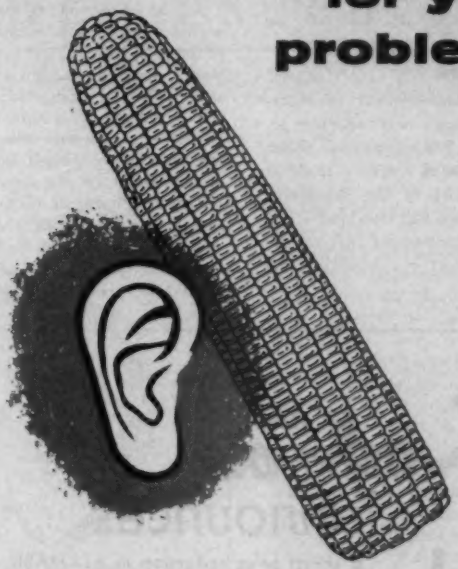
The staining reactions also serve to show the heavy lignin deposits in compression wood cells, the rapid delignification of springwood, and, in certain cases (where pulp washing has been poor), the retention of lignosulfonates in the cell cavities.

Wood sections and various types of lignin are also examined by the staining reactions. Twenty-seven references are given. Georg Jayme and Marianne Harders-Steinhaüser, *Das Papier*, 8, 509-20 (1954) (in German).

Improvements in loading paper rolls in Finland

The unloading of rolls of paper from ordinary freight cars often could not be done without tipping the rolls, resulting in damage to the paper. To eliminate this tipping the State Board of Railways in Finland cooperated with experts in the paper industry and designed a new type of car for paper transport. The roof is made of two loose parts that can be lifted off separately; the rolls can then be loaded through the open roof.

we've got an "ear" for your problems



Whether *your* problem is in connection with sizing or coating, Clinton starches and dextrins are almost certain to provide an answer.

For example, when you surface-size with Clinton starch, you'll improve strength . . . improve "finish" or smoothness . . . increase "rattle" . . . and reduce surface fuzz, thereby improving printing characteristics.

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An initial transport of this type with a carload of paper to the port of Kotka was unloaded into the hold of a ship *completely undamaged*. Anon., *Finnish Paper and Timber*, 5, No. 8, 107 (1954) (in English).

Determination of fiberboard bending strength

In 1951, a standard method for fiberboard bending strength was adopted internationally by the FAO Congress. When this method was used in a special study at the Central Laboratory of the Wallboard Industry at Stockholm, the low head speed seemed impractical for routine analysis and also made it difficult to determine the breaking load.

Foreign Abstracts . . .

Studies on various fiberboards were made with a view towards determining the effects of head speed and of span, and the data were analyzed statistically. The results show that the choice of head speed and span, respectively, within the limits of 0.4 to 2.0 cm. per min. and 16-28 times the thickness of the sample have no significant effects, either on the standard deviation or on the coefficient of variance. Therefore, it seems reasonable to choose the higher speed. Hans-Heinrich Fickler, *Svensk Papperstidn.*, 58, 107-112 (1955) (in Swedish, with a brief English summary).

Solvent-solute interaction on viscosity of cellulose nitrate solutions

A raw native cotton (D.P. 4700) is nitrated in 85 per cent phosphoric acid, using mixtures containing 64 parts nitric acid, 26 parts phosphoric acid and 10 parts phosphorus pentoxide. The influence of solvent-solute interaction on the viscosity of these high molecular weight cellulose nitrates is studied under conditions of controlled rates of shear. Variations in the solvent-solute interaction are effected by using different solvents or by using ethyl acetate and varying the nitrogen content of the cellulose nitrate. In either case, similar results are obtained.

Every intrinsic viscosity can be recalculated to the same value, valid for a constant degree of substitution; so apparently no degradation occurs during the nitration. The poorer the solvent, or the lower the nitrogen content, the lower is the viscosity.

It is found that shear dependence is primarily a function of viscosity. The double logarithmic relation between rates of shear and viscosity is linear, with a slope that increases with increasing solvation, although not as rapidly as when the D.P. is varied. For the same viscosity, dependence of shear is lower the higher the D.P. The more effective the solvent or the greater the N-substitution, the greater the increase in the dimension of the molecular coil (the increase in viscosity). This results in increased sensitivity to changes in rates of shear and to a decreased viscosity slope constant k' (in Huggins' equation, *J.AM.Chem. Soc.*, 64, 2716 [1942]).

After having corrected for all other effects (such as drainage, capillary end effects, kinetic energy losses, non-Newtonian flow, and concentration), every value for viscosity must be recalculated to a common degree of substitution to actually be comparable. Only after this is done may values for viscosity be converted into D.P. Eight graphs, six tables, and 21 references are given. T. E. Timell, *Svensk Papperstidn.*, 57, 913-20 (1954) (in English).

"Autohydrolysis-sulfate" pulping in Italy

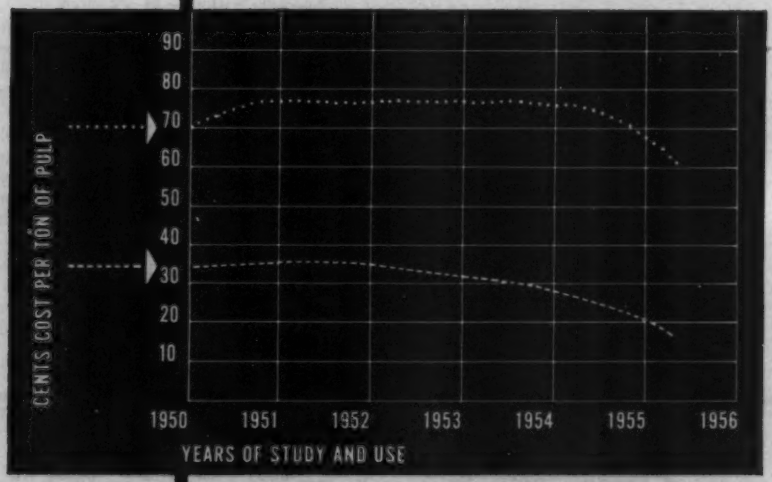
The term "autohydrolysis" refers to an aqueous prehydrolysis which is then followed by a kraft cook. These cooking conditions are applied to mixtures of very dissimilar woods, so as to obtain data on application of the procedure to woods of varying species and density. Even such mixtures as spruce and beech, and spruce and eucalyptus give some pulps of excellent quality and good uniformity. Apparently, the process should also be applicable to the production of dissolving pulps made from mixtures of tropical woods varying morphologically and in density.

One table, 2 figures and 6 references are given. G. Centola, F. Pancirolli, and G. Ceragioli, *Industria Carta (Milan)*, 8, No. 7, 83-5 (1954) (through *Bull. Inst. Paper Chem.*, 25, 391, [1955]) (original in Italian, with French and English summaries).

Rhodia announces

a sharp price reduction in ALAMASK, with *improved odor abatement* for all operations of alkaline pulping, at new low costs per ton of pulp.

This means lower prices for the new ALAMASK P6D . . . lower cost per ton of pulp for control of malodors, whether you treat gases from digester operations, recovery, or condensers. Let the chart tell the story —



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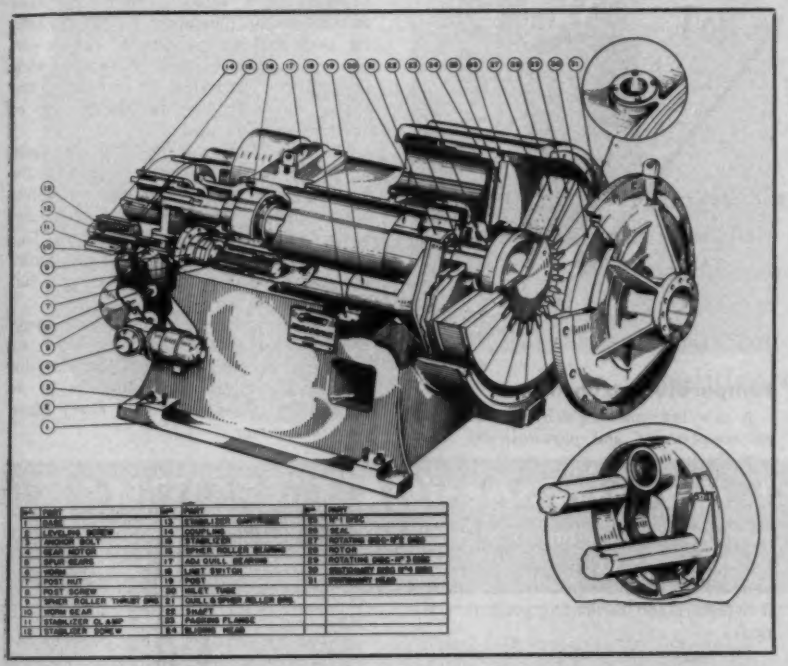


Pressurized double disc refiner

A complete line of pressurized double disc refiners, called the Double D, is available in three sizes: 26, 34, and 42 in. These designations refer to the disc diameters. Power requirements range from 200 hp for the 26 in. size to 700 hp for the 42 in. unit.

The Double D refiner is a completely pressurized unit with pulp flow through the machine made almost completely independent of the disc design. It is a pump-through machine, and normally there is a pressure drop through the machine. Throughput is controlled by a valve on the inlet side and a valve on the outlet side of the refiner, and the pressure drop through on the refiner.

According to the manufacturer, this refiner is the only disc-type stock preparation machine presently on the market which has a straight-forward mechanical adjustment. It is also claimed that the Double D refiner is the only one of its kind with two stages of refining in the same machine.

The diagram in the lower right hand corner of the illustration shows the sectional perspective assembly of the refiner.

The refiner, which requires very little floor space, can be installed in any convenient location. Mezzanine location and special fluming arrangements are not required. It can be piped and operated in much the same way as a conventional jordan installation. *E. D. Jones & Sons Co., Pittsfield, Mass.*

Utility crane

A self-propelled, one-man operated, rubber-tired utility crane was recently introduced. The manufacturer states that the machine, with Speed-o-Matic true power hydraulic control, offers unique advantages previously unknown to utility cranes. Designated as the UC-68, with 15-tons lifting capacity, this crane is specially designed for mobile work in pulp and paper operations and related fields, as well as in other industrial operations.

The crane lifts, stockpiles scrap or general bulk materials, digs, sets steel and performs hundreds of other jobs around the yard or in the field. It works equally well with crane, clamshell, dragline, lifting magnet, shovel or hoe attachments and travels from job to job at speeds of up to 7 mph.

The UC-68 is equipped with an independent rapid boom hoist, which provides power controlled raising or lowering of the boom. Two important work-speeding optional features are reversing clutches for either or both main drums and independent swing and travel. Other optional features are also available.

Variable hydraulic pressure acts directly on the clutch. There's no mechanical linkage. The clutches are self-compensating for heat and normal lining wear. All clutches, except the shovel retract clutch, are interchangeable. Clutches feature cast iron clutch shells.

Anti-friction bearings, splined shafts and precision machined surfaces are used throughout the upper machinery, which rides on eight, precision machined, conical hook rollers, minimizing wear and eliminating center pinup-pull. The carrier features hydraulic stabilizers which are operated from the control panel in the machine's cab. There is all-welded, stress-relieved construction throughout.

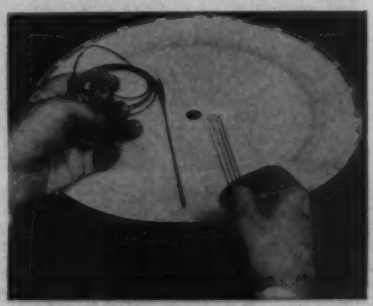
The UC-68 is powered by gasoline engine equipped with a torque converter. The two-speed travel gear arrangement in the revolving upper provides two travel speed ranges in either direction. *Link-Belt Speeder Corp., Cedar Rapids, Iowa.*

Reodorant

"Alamask" D has been added to the Rhodia line of preferred reodorants for use in masking traces of mercaptan odors in neoprene or similar synthetic rubber employed in bag stocks, coatings or as latices.

This powerful reodorant can be used in very low concentrations to provide adequate odor coverage, particularly in paper or pulp stock used for containers. As little as one part in 5-10 million dilution provides coverage of trace malodors.

"Alamask" D is stable to high-temperature curing operations and may be employed to offset more volatile odors resulting from seam binding, annealing or lamination. *Rhodia, Inc., 230 Park Ave., New York 17, N. Y.*



Instrument recording pen

A new instrument recording pen, now on the market, is said to save operating dollars daily by speeding data interpretation and relieving skilled personnel of monotonous duties.

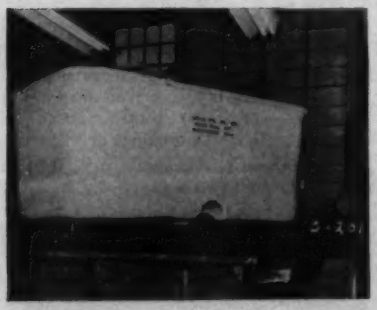
This featherweight, stainless steel capillary pen is fed from a clear, hermetically-

New Products . . . . . .

sealed, plastic ink sac containing over a year's supply. Capillary action maintains continuous flow to a precision ground point, which traces a sharp, opaque, quick-drying record. According to the manufacturer, "poisoning" of intersecting records is practically eliminated, thus perfecting chart legibility. As many as four pens trace on parallel time arcs only forty-two thousandths of an inch apart, which simplifies record interpretation and analysis.

The sealed inking system prevents sludge and oxide formation, according to the manufacturer, who also claims that it is contamination-proof, non-corrosive, non-evaporating, and delivers an uninterrupted flow of fresh ink in brilliant color. It is reported that pens have run on equivalent 15-year accelerated tests at ambient temperatures from 20° to 140° F. without breakdown or appreciable wear.

This inking system is designed for exclusive use in the new Bailey recorder. Actual chart sample and Product Specification E12-5 are available on request. *Bailey Meter Co., 1050 Ivanhoe Rd., Cleveland 10, Ohio.*



Plastic broke cart

The Plasticart, a new lightweight cart for either wet or dry broke, is constructed of strong, durable Fiberglas. Rubber tired wheels, which are equipped with Timken roller bearings, are easily removed for replacement. A cart 70 in. long, 40 in. wide, and 30½ in. deep weighs 166 lb. and stands 36 in. off the floor. Other sizes are also available. *Patton Mfg. Co., Inc., Paper Mill Div., Springfield, Ohio.*

Hogger

The "Big 60" hogger incorporates an entirely new principle in grinding wheel application. This new development uses a grinding wheel 60 in. in diameter of periphery segmental-type mounting. It is made up of 40 large abrasive segments alternately mounted. Positive elmination of burns, heating or checking of the work pieces is a feature of this machine, according to the manufacturer.

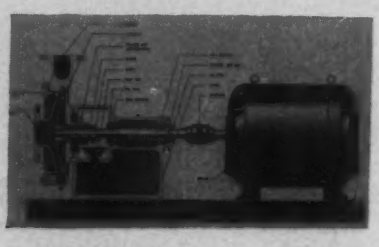
Belt covers are provided to protect the machine ways from dirt, vapor and grit. All castings are normalized to remove stresses and strains. Machine ways are ground, lapped, and scraped. Table and bed way surfaces are finished to precision tolerances, it is claimed. Large-capacity coolant systems are motor driven. Motor driven way lubrication is complete with oil filter. Wheel guards are of heavy-duty boiler plate. Wheel dressing attachments complete the machines for standard operation. Machine weights range from 20,000 to 65,000 lb. *Hanchett Mfg. Co., Big Rapids, Mich.*

Temperature transmitter

A new instrument which measures process temperatures and pneumatically transmits the information to a central recording or controlling station has been announced. Known as the Model 12A temperature transmittei, it is a non-indicating device of the "force balance" type, with a calibrated accuracy of ½ per cent of the temperature span and compensated for ambient temperature and barometric pressure variations.

Of rugged construction and simple in operation, the new transmitter is designed around a gas filled thermal system which exerts force on a flapper-nozzle mechanism in proportion to the measured temperature. The resulting back pressure in the nozzle circuit, amplified through a relay and converted to a force through a bellows, quickly balances out the initial force and constitutes the 3-15 psi output transmitted by low-cost tubing to the receiving instrument.

Spans ranging from 50°F. to 400°F. are available and can be utilized between the limits of −100°F. and +1000°F. *Foxboro Co., Foxboro, Mass.*



Centrifugal pumps

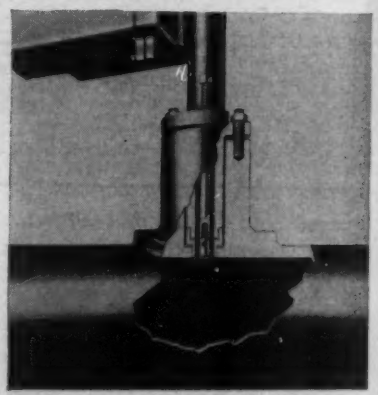
Three additional sizes of the Oliver Type "L" centrifugal pump have been announced. The complete range now includes 1, 1¼, and 1½ in. models in addition to the 2 in. unit, first of the series to be developed.

In the three larger sizes of Type "L" pumps all parts in contact with liquid are made of either stainless steel, bronze, or cast iron. Impellers of three different diameters can be supplied, and the pumps may be either direct-connected or V-belt driven. Two types of shaft seals are also available: the conventional stuffing box with packing or the special Oliver Type "C" carbon seal in which there are no moving parts.

At present, the 1 in. model is available only in stainless steel with one diameter impeller. It is direct connected with an integral motor mounting, and a mechanical shaft seal with a ceramic against carbon sealing face is employed. In all models frames are constructed of cast iron, and shafts which require no sleeves are of stainless or alloy steel.

The manufacturer claims that the major advantage of the Type "L" pump is the high cut-water or "tongue" of the volute which makes the unit self-venting and minimizes formation of air pockets. This same feature is responsible for easy priming and better maintenance of prime during operation.

Type "L" pumps are particularly adaptable to vacuum filter and evaporator applications in which liquid must be discharged under vacuum as high as 25 in. of mercury. *Dorr-Oliver Inc., Barry Place, Stamford, Conn.*



Pressure transmitter

A new pressure transmitter with no stagnant pressure lines has been announced. Designed primarily for use with other units of the company's autronic electronic control system, several advantages are claimed, particularly with polymers, slurries, asphalts, viscous fluids, etc., which solidify when stagnant. It permits pressure measurements at high operating temperatures.

Designated as the "P3T" flush diaphragm pressure transmitter, it is continuously adjustable and is used with recorders or controllers in pressure ranges of 0-200 to 0-1000 psig and 0-1000 to 0-2500 psig for operation at temperatures up to 300° C. Models for operation at higher temperatures are available on special order.

The manufacturer claims that the sensitivity of the unit is better than .005 per cent, reproducibility .1 per cent, and accuracy 1 per cent. Change in temperature of the process fluid is not transmitted to the signal because expansion of the measuring parts affects the signal only so far

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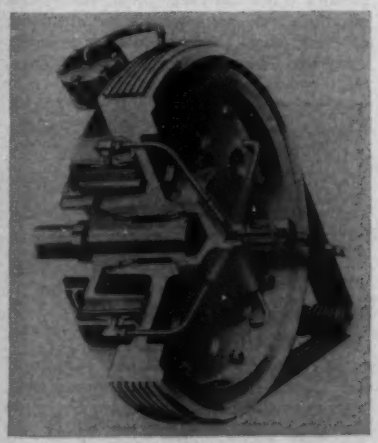
as the spring rate of the diaphragm is concerned. With this transmitter, this rate is negligible and, therefore, temperature effects are low. The diaphragm cap is easily replaceable. *Swartwout Co.*, 18511 *Euclid Ave., Cleveland* 12, *Ohio.*



Standardized press application

A new standardized press application is now offered to users and manufacturers of open back inclinable and straight side presses. The application features the Fawick Airflex clutch and brake in a completely packaged arrangement, including new flywheel mounted on anti-friction bearings, components and electro-pneumatic controls. Each application is designed for simplified installation on all presses, making possible press modernization for automation and increased production.

The packages are made in seven sizes adaptable to OBI and straight side presses ranging from 15 to 110-ton capacity. Prices of the complete application, it is claimed, are about half the present cost of converting an old press to air clutch operation. *Fawick Airflex Div., Fawick Corp.*, 9919 *Clinton Rd., Cleveland* 11, *Ohio.*

Dealkalizer

A new dealkalizer, now on the market, utilizes the ion exchange principle of salt splitting as an effective means of reducing alkalinity in boiler feed and process water.

The Cochrane process substitutes chloride ions for bicarbonate, carbonate, sulfate and nitrate ions, reducing water alkalinity by over 90 per cent. Since no carbon dioxide is formed, no aeration of the water is subsequently required. Dealkalizing provides continuous water treatment under pressure, and no pumping is required.

The dealkalizer unit utilizes a strong basic anion resin which is regenerated with either sodium chloride or a mixture of sodium chloride and caustic soda. The process is semi-automatic, with a single Solo valve or hydromatic valve handling the entire regeneration cycle. Completely automatic cycling is possible by the use of a meter on the effluent and a hydromatic valve, electrically operated. *Cochrane Corp., Philadelphia 32, Pa.*

Automatic weighing unit

A new development in the field of weighing has recently been announced. This streamlined automatic weighing unit features projection type of weight indication. The exact weight is flashed on a large, wide-angle "Teleview" screen.

This self-contained "Weightograph" incorporates the use of a precision chart on microfilm. The figures and graduations are magnified by means of the latest methods of optical projection to 28 times their original size and are reflected on the screen of the "Weightograph."

New Products . . . . . .

The weight reading is visible under direct sunlight and for distances as far as the operator's reading range. The graduations, figures, and pointer are projected optically in the same plane, eliminating scale parallax and its weight reading errors, it is claimed.

Other features include: a positive drive, with no lost motion or backlash; no rack and pinion; backweighing within front weighing tolerances; agate bearings and knife edge pivots for longer life, and easy calibration.

This weighing unit is available in a short bench style or a tall column floor style, with capacities from 31 to 2,400 lb. *Howe Scale Co., Inc., Rutland, Vt.*

Dispersible polyethylene complex

The development and availability of Polypel F, a 100 per cent active water dispersible polythylene complex, was recently announced.

Polypel F is supplied as a solid. The aqueous dispersion is easily made by heating the water to 190-200°F, adding the polyethylene complex and an activator, and gently stirring until uniformly dispersed.

According to the manufacturer, an application of ¼ to 1 per cent of this polyethylene complex at the size press or calender will produce a sheet having excellent water repellency. It is also claimed that Polypel F helps improve the finish and maintains the color.

The Polypel F dispersion is cationic and may be applied by size press, calender box, or at the wet end. *Aquex Development & Sales Corp., Whippany, N. J.*

Traction plates for tires

A traction assembly for trucks, consisting of easily-applied spring steel plates which are said to flex with the tires to provide safe, vibrationless operation at normal speeds, has been announced. The traction assembly is designed to bring trucks through safely and on time in spite of snow, ice, mud or other adverse surface conditions. According to the manufacturer, drivers can equip their rigs in a matter of minutes with these "Trac-Plates."

A "Boss-Spacer" replaces the ordinary spacer on spoke hubs between dual wheel mountings. Once in place, this rugged fixture is ready to engage the bolts for securing the traction plates to the tire treads. The spring steel plates with cleats are drawn down into locked position on the tire treads by means of leverage gained as the bolts are tightened. For "Budd" or disc wheels, an adapter is available.

These traction plates function as an integral part of the dual tires. Individually applied plates permit use of as many as are necessary for the driver's particular use. This traction assembly, it is claimed, is built to last as long as the truck or other vehicle. There is nothing to break or pull apart. *Tractioneer Co.*, 410 *N. Michigan Ave., Chicago* 11, *Ill.*

Steam trap

A completely new line of low, medium and high-pressure steam traps has been announced. The new line, known as "Hydro-Flex," is available in semi-steel, cast steel and forged steel construction for use on any and all pressures up to 2,500 psi and temperatures to 1160° F.

All of the internal working parts are of heavy stainless steel to withstand the most severe operating conditions. The bucket is of stainless steel, deep drawn with no seams or joints. There are no removable pins.

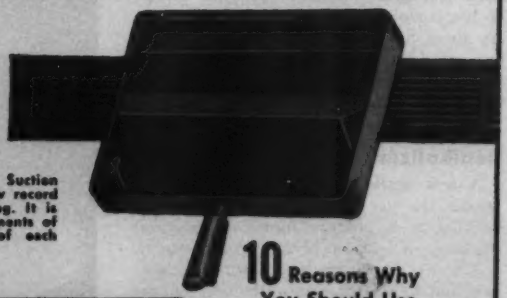
An outstanding feature of this new trap design is the dual fulcrum which powers the valve lever. This includes a primary high leverage fulcrum for cracking the valve from its seat and a secondary low leverage fulcrum to open the valve wide and give maximum unrestricted flow. This discharge arrangement makes possible high discharge flow rates when required, yet permits efficient handling of very low condensate loads. *Strong, Carlisle & Hammond Co., Cleveland, Ohio.*

Bridge added to hydraulic roll lowering table

To lengthen the receiving portion of the "Murco" hydraulic roll lowering table, a bridge that raises and lowers to move the paper roll closer to the winder has been added. This improvement in design is said to increase the efficiency of this equipment.

The hydraulic roll lowering table eliminates the need for complicated, expensive hydraulic unloading tables or cumbersome overhead hoist arrangements and prevents paper roll damage, bending or breaking of winder shafts, according to the manufacturer. *D. J. Murray Mfg. Co., Wausau, Wis.*

RES-LIN wire saver
SUCTION BOX COVERS
are
PROVEN by TEST



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3. Increased wire life.
4. Many years of trouble-free service.
5. Resurfacing reduced to a minimum.
6. Expansion and contraction is reduced to a minimum.
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9. Easily installed.
10. No other can offer as even-wearing and wax-like surface as Reslin.

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WIRE RES-LIN SAVER

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NEW LITERATURE

Books

DETERIORATION OF MATERIALS: CAUSES AND PREVENTIVE TECHNIQUES. Edited by Glenn A. Greathouse and Carl J. Wessel. Published by Reinhold Publishing Corp., 430 Park Avenue, New York 22, N. Y. 6¼ x 9½. 850 pages. $12.00.

Prepared with the collaboration of 24 specialists in the field of what might be termed "deterioration prevention," this book describes and analyzes the causes of deterioration in materials and presents proven techniques for preventing or retarding such deterioration.

The volume is divided into four sections. The first section covers some important factors in deterioration: climate, and chemical, physical, and biological agents. The next section discusses the prevention of deterioration for such materials as metals, wood, paper, textiles, cordage, leather, plastics and rubber, paints, varnishes, lacquers and enamels. The third section discusses some assembled units — electrical and electronic equipment, optical instruments and photographic equipment — and their preservation. Lastly, there is a section on some special aspects of preservation, including dehumidification, recommended packaging and storage techniques and test methods for evaluating the toxicity of preservatives toward humans. A bibliography is given at the end of each chapter.

The chapter on paper covers the composition and manufacture of paper, and the biological, physical, and chemical deterioration of paper.

Appendices are provided on climatic systems and on specifications useful for those doing business with government agencies.

LOW TEMPERATURE TEST METHODS AND STANDARDS FOR CONTAINERS. Edited by Earl C. Myers and Norbert J. Leinen. Published by Quartermaster Food and Container Institute for the Armed Forces, 1819 W. Pershing Rd., Chicago 9, Ill. 6 x 9. 126 pages. Paper-bound.

This symposium was arranged and conducted by the National Research Council Committee on Packing, Packaging and Preservation in cooperation with the Quartermaster Food and Container Institute. The papers and discussions summarize current knowledge on low-temperature test methods, appraise the facilities available for further experimental work, and indicate the technical problems which must be explored further.

The book, which comprises 11 papers, is divided into four sections: Military Implications; Facilities for Low-Temperature Research; Effect of Low Temperatures on Containers, and Effect of Low Temperature on Container Components. The third section contains two papers dealing with multiwall bags: "Background of Use of Multiwall Bags by the Armed Forces" and "Testing Multiwall Bags at Low Temperatures."

NEW RAPID TAX DEPRECIATION: HOW TO USE IT PROFITABLY. By Willard F. Stanley. Published by Prentice-Hall, Inc., 70 Fifth Ave., New York 11, N. Y. 8¾ x 11½. 153 pages. $15.00.

This book presents information about the taxpayer's rights with respect to the rapid depreciation of new property provided for in the 1954 revision of the federal tax law and demonstrates why adoption of rapid depreciation will substantially benefit most taxpayers.

The appendix contains several hundred tables arranged for easy use in computing actual depreciation allowances. An explanation gives details on their nature and use.

All important factors to be considered in deciding whether to adopt one of the new alternative methods for rapid depreciation are presented. Following are the chapters covered: "Your Tax Rights in Selecting a Depreciation Method," "Financial Aspects of Rapid Depreciation," "How to Compute Your Economic Gain from Rapid Depreciation," "Accounting Treatment of Rapid Depreciation," "Other Important Aspects of Rapid Depreciation," "When is Rapid Depreciation Inadvisable?" and "Conclusions and Typical Cases."

Examples and tables show not only the principles but the step-by-step calculations used in making the various computations. Highlights of the text are summarized at the end of each chapter. These summaries outline the various advantages of rapid depreciation and give the crux of the benefits likely to be derived by adopting one of the accelerated methods.

PULP AND PAPER MANUFACTURE BIBLIOGRAPHY AND UNITED STATES PATENTS, 1953. Compiled by W. B. Weber and Jack Weiner. Published by the Technical Association of the Pulp and Paper Industry, 155 East 44th St., New York, N. Y. 6 x 9¼. 520 pages.

This volume contains the literature on pulp and paper manufacture published during 1953 and United States patents of interest to the pulp and paper industry issued during this period, as well as those patents of earlier issue date which were overlooked at the time of issue.

Books and periodical articles on almost all phases of pulp and paper manufacture are listed in this bibliography. Articles on machinery, lubrication, power and its many ramifications, safety and similar topics are included, in general, only when such articles appear in magazines devoted to the pulp and paper industry.

The patents on pulp and paper manufacture and related subjects included in the second part of this volume have been selected from the *Official Gazette* of the United States Patent Office.

Also included in this volume is a list of the journals covered, an author index, subject index, and numerical patent index.

Booklets and Pamphlets

FACTORS INFLUENCING WATER REMOVAL IN A PLAIN PRESS (Vol. II, No. 7). Published by F. C. Huyck & Sons, Rensselaer, N. Y. 6 x 9¼. 16 pages. This bulletin points out the basic principles involved in water removal in a plain press as they apply to machine operation. Many graphs and diagrams are included.

PALLETS AND PALLETIZATION. Published by National Wooden Pallet Manufacturers Association, Barr Bldg., Washington 6, D. C. 8½ x 11. 18 pages. $1.00. This handbook on pallets and their application to industry begins with an explanation of palletization, the reasons for it, and how to properly plan for it. The booklet continues with sections on principles of pallet construction, specifications, how to choose and purchase the correct pallet, unit load patterns, and instructions for the use, maintenance, and inspection of pallets. A glossary of terms and a list of government specifications are included for reference purposes.

HOW TO ROOT AND GRAFT SLASH PINE. (Station Paper No. 46). By François Mergen and Harry Rossoll. Published by Southeastern Forest Experiment Station, Asheville, N. C. 8 x 10½. 22 pages. In this outline, various steps for vegetative propagation of slash pine are illustrated and described in detail. Included are methods for air-layering, grafting with succulent and dormant material, and inarching seedlings into the crowns of mature trees.

THE FOLDING CARTON. Published by Folding Paper Box Association of America, 337 W. Madison St., Chicago 6, Ill. 8½ x 11. 56 pages. $1.25. This revised edition of the manual published in 1950 is devoted to the history and manufacturing

New Literature . . .

of the folding paper carton. Containing many illustrations, the book combines a complete graphic review of the industry for the casual reader and a detailed step-by-step treatise for the technical worker. The complete boxmaking operation is explained in a clear, easy-to-read style.

DESIGN AND DEVELOPMENT OF SEALLESS PUMPS. By D. P. Litzenberg and H. T. White. Reprinted by Chempump Corp., Station B, 1300 East Mermaid Lane, Philadelphia 18, Pa. 8¼ x 11¼. 12 pages. This article reprint from *Chemical Engineering Progress* magazine describes the design and development of centrifugal pumps that have no seals or stuffing boxes. It covers design history and early experimental work and outlines the basic problem of building an electric motor inside a pump. Included are detailed data regarding temperature, pressure, and the effects of the unusual pump design on electric motor operation. New developments in the canned rotor pump field are discussed, and a series of operational case histories are given.

PLUS COSTS OF ACCIDENTS. Published by the National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill. 6 × 9. 8 pages. This booklet tells concisely how accidents nibble at profits and outlines the "why" and "how" of accident control. Intended specifically for firms with no safety staff, the booklet sets down seven easy steps for eliminating accidents and suggests sources of help. It explains in non-technical terms how these common-sense principles make for a good safety program and at the same time increase production.

OILLESS BEARINGS—THEIR PLACE IN INDUSTRY (Reprint No. 164). By Charles D. Spadone. Reprinted by Spadone-Alfa Corp., Advertising Dept., Box 523, South Norwalk, Conn. 8¼ × 11¼. 8 pages. Reprinted from *Iron and Steel Engineer* magazine, this article is essentially concerned with oilless bearings having a dry metallic lubricant, but other main types in this bearing classification are also considered. The various properties to be considered in determining the advantages or limitations of a bearing for a particular application are discussed. A section on practical engineering data of general interest is included.

GUIDE FOR GRADING SOUTHERN PINE LOGS. By George H. Englerth and Walton R. Smith. Published by Southeastern Forest Experiment Station, Asheville, N. C. 3¾ x 7. 6 pages. This pocket size guide is a simplified system to aid in interpreting "Interim Log Grades for Southern Pine" (published in October, 1953). Three tables based on 2-, 3-, and 4-face grading are contained in this booklet. Figures by log diameters are given for knot size, sweep, and bad-knot specifications. Inches of degrading sweep and bad-knot size for each log diameter are also shown. Grading instructions and definitions of terms used are included. A grading stick diagram based on 3-face grading is also available.

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Manufacturers' Publications

Through the co-operation of manufacturers and suppliers, THE PAPER INDUSTRY *lists the following catalogues, bulletins and booklets. They may be obtained without cost or obligation, unless otherwise specified, by writing direct to the manufacturers. Please address requests on your company letterhead.*

Metal Grating. Klemp Metal Grating Corp., 6605 S. Melvina Ave., Chicago 38, Ill.—All types of grating, open steel floor armor, stair treads, vessel liners, bridge decking and drain grates are covered in a new 16-page data and specification manual.

Custom-Fabricating Tanks & Pressure Vessels. Nooter Corp., 1405 S. Second St., St. Louis 4, Mo.—This 50-page booklet takes the reader on an inspection trip through Nooter Corp., presenting a brief history of the corporation, and illustrating and describing the research laboratory, engineering department, metalworking machines, techniques of metallurgy, inspection department, equipment fabricated by Nooter, and installation of equipment by the field construction department. A four-page chart presents corrosion data.

Corrosion-resistant Plastic Pipe. American Hard Rubber Co., Dept. PI, 93 Worth St., New York 13, N. Y.—Complete technical data on "Dur-Ace," a new general-purpose, corrosion-resistant, rigid plastic pipe, in 6-page Bulletin 80-A includes general properties, chemical resistance tables, standard sizes, pressures, and prices of pipe, fittings, and diaphragm, together with installation and fabrication data.

Millivoltmeter Pyrometers. Bristol Co., Dept. PI, Waterbury 20, Conn.—Bulletin P1244, consisting of 12 pages, describes the complete Bristol line of millivoltmeter pyrometers and accessories.

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Water Conditioning Equipment. Cochrane Corp., Dept. PI, 3107 N. 17th St. Philadelphia, Pa.— 4-page Bulletin No. 6210 briefly covers Cochrane's entire line of water conditioning equipment and specialties.

Converting Equipment for Multiwall Bags. Potdevin Machine Co., Dept. PI, 285 North St., Teterboro, N. J.—This 8-page catalogue contains complete specifications and illustrations of multiwall tubing machinery, two and four color oil-ink printing equipment, sleeve valvers, valvers, sewing machines, and conveyors. A suggested factory floor plan for sewed-end, multiwall bags is given.

Sheaves. Farrell-Creek Steel Co., Dept. PI, Sandusky, Ohio—This 4-page folder contains information about carbon and alloy cast steel sheaves.

Paper Shredder. Hommel Machine Works, Dept. PI, 2340 Adeline St., Oakland 7, Calif.—A heavy-duty paper shredder that is said to shred one ton of paper per hour is described in Folder HW-29.

Paper Mill Cores. Sonoco Products Co., Dept. PI, Hartsville, S. C.—This 4-page bulletin describing paper mill returnable and non-returnable cores, as well as the "Bermico" metal ends, includes specifications and photographs.

Pneumatic Conveying Systems. Convair Corp., Dept. PI, 4156 Library Rd., Pittsburgh 34, Pa.—12-page Bulletin No. 105 describes three types of conveyors which are available: vacuum, vacuum pressure and pressure systems. A number of diagrams are shown.

Chemical Cleaning. Dowell Inc., Dept. PI, P. O. Box 536, Tulsa 1, Okla.—How to restore five water filters to efficient operating condition without replacing the filter beds is the subject of this 2-page bulletin.

Chemical Control & Testing. Hall Laboratories, Inc., Dept. PI, Hagan Bldg., 323 Fourth Ave., Pittsburgh 30, Pa.—The need for chemical control and testing to assure the success of a water conditioning program is discussed in this new 6-page folder. Examples of the varying needs for testing equipment by different types and sizes of plants are given.

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Pulp and Paper, Volume 1	$18.00
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Procedure Handbook of Arc Welding	2.00
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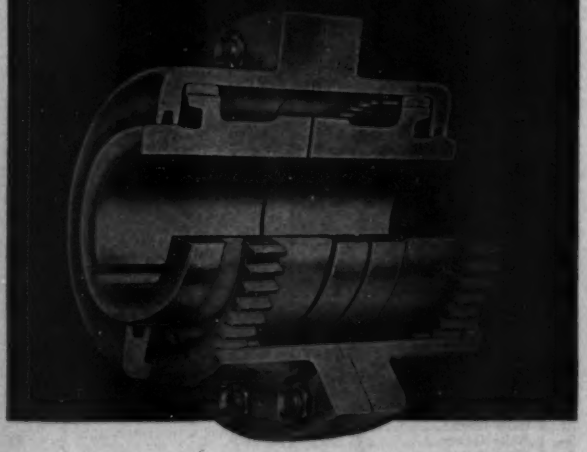

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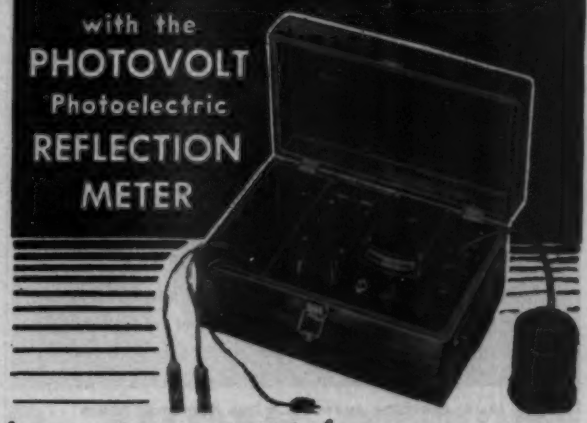

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Engineering and Manufacturing Company, Watertown, N. Y.

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It's **chemical hydration** by the pound.

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Briefly, benefits following partial replacement of **mechanical** refining with this amazing gum include:

Opportunity for employing **higher percentages of short fibred pulps . . . reduced cost of power** for refining . . . **uniform formations** . . . faster drainage . . . surprisingly excellent freeness on presses and dryers **. . . faster machine speeds . . . less decided "grain" . . . lower densometer readings . . . greater bulk, compressibility, opacity, and porosity . . . better tensile, fold, tear . . . less hygroexpansivity, curl, wrinkle, or warp . . . less two-sidedness.**

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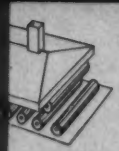

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MARKET QUOTATIONS

RAGS (Domestic)

NEW RAGS

The following are quotations to mills, f.o.b. New York:

	per cwt.		
No. 1 White Shirt Cuttings	14.50	to	15.00
New Unbleached Muslins	16.50	to	17.00
Fancy Shirt Cuttings	7.00	to	7.50
No. 1 Percales	7.00	to	7.50
No. 1 Washables	3.00	to	3.25
No. 1 Light Silesias	8.00	to	8.50
No. 1 Light Prints	6.00	to	6.25
Light Flannelettes	8.00	to	8.50
Cottonades	3.75	to	4.00
Blue Overalls	8.00	to	8.50
Blue Cheviots	7.75	to	8.25
Canton Flannels, Bleached	11.50	to	12.00
Canton Flannels, Unbleached	11.50	to	12.00
Osnaburg Cuttings	10.00	to	10.50
Underwear Cuttings, Bleached	16.00	to	16.50
Underwear Cuttings, Unbleached	16.00	to	16.50
Khaki Cuttings—			
Suz Tan	6.50	to	6.75
Mixed	3.75	to	4.00
Linen Cuttings—			
American	7.50	to	8.00
White	13.00	to	14.00
Gray	13.00	to	14.00

RAGS (Domestic)

OLD RAGS

Quotations to consuming mills, dollars per hundred pounds, f.o.b. New York, follow:

Roofing	per cwt.		
No. 1	1.45	to	1.55
No. 2	1.20	to	1.30
No. 3 and 4	.90	to	1.00
Twos and Blues—			
Repacked	2.25	to	2.50
Thirds and Blues—			
Repacked	2.00	to	2.25
Miscellaneous	1.85	to	1.85
Whites, No. 1—			
Repacked	3.75	to	4.00
Miscellaneous	3.25	to	3.50
White, No. 2—			
Repacked	2.75	to	3.00
Miscellaneous	2.25	to	2.50

RAGS (Foreign)

ex dock New York City

NEW RAGS

	per cwt.
New Dark Cuttings	Nominal
New Mixed Cuttings	
New Light Silesias	
Light Flannelettes	
Unbleached Cuttings	
New White Cuttings	
New Light Oxfords	
New Light Prints	

RAGS (Foreign)

ex dock New York City

OLD RAGS

	per cwt.
No. 1 White Linens	Nominal
No. 2 White Linens	
No. 3 White Linens	
No. 4 White Linens	
No. 1 White Cottons	
No. 2 White Cottons	
No. 3 White Cottons	
No. 4 White Cottons	
Extra Light Prints	
Ord. Light Prints	
Med. Light Prints	
Dutch Blue Cottons	
French Blue Cottons	
French Blue Linens	
Checks and Blues	
Linsey Garments	
Dark Cottons	
Old Shoppories	

ROPE and BAGGING

f.o.b. and ex dock New York City

	per cwt.		
Gunny No. 1—			
Foreign	5.50	to	6.00
Domestic	5.50	to	6.00
Wool Tares—			
Light	5.50	to	6.00
Heavy	5.75	to	6.25
No. 1 Scrap Bagging	4.50	to	5.00
Manila Rope—			
No. 1 large	5.25	to	5.50
No. 1 small	4.25	to	4.50
Sisal Rope—			
No. 1 large	4.75	to	5.00
No. 1 small	4.25	to	4.50
New Burlap Cuttings	5.75	to	6.25
Jute Threads—			
Foreign (Nom.)	6.00	to	6.25
Domestic	6.25	to	6.50
Strings—			
No. 1 sisal	4.75	to	5.00
No. 2 sisal	4.25	to	4.50
Soft jute	4.75	to	5.00
Mixed	2.50	to	2.75

WASTE PAPER

The following are quotations, dollars per ton, for No. 1 packing f.o.b. New York:

Shavings—	per ton		
Hard White Env. Cuts.	125.00	to	135.00
Hard White No. 1	100.00	to	105.00
Soft White, one-cut	75.00	to	80.00
Soft White, No. 1	60.00	to	65.00
Coated Soft	40.00	to	45.00
Fly Leaf No. 1	25.00	to	30.00
Fly Leaf, Woody No. 1	25.00	to	30.00
No. 2 Mixed Col. Woody	20.00	to	25.00
Flat Stock—			
No. 1 Heavy Books and Magazines, Repacked	22.00	to	24.00
Mixed Books	16.00	to	17.00
Ledger Stock—			
No. 1 White	55.00	to	60.00
No. 1 Mixed (Colored)	35.00	to	45.00
Manilas—			
New Env. Cuttings	70.00	to	75.00
New Cuts, One-Cut—			
Extra Manilas	19.00	to	20.00
Manila Tab Cards, Free of Ground Wood	85.00	to	95.00
Colored Tab Cards	60.00	to	65.00
Kraft—			
New Envelope Cuttings	65.00	to	70.00
Tripled Sorted No. 1 100%	40.00	to	45.00
No. 1 Old Assorted	27.50	to	32.50
News—			
White Blank	65.00	to	70.00
Overissue	26.00—		
No. 1 Folded	30.00—		
Old Corrugated Containers	22.00—		
New Jute Corrugated Cuts	27.00—		
Mill Wrappers	18.00—		
Box Board Chips	11.00—		
No. 1 Mixed Paper	10.00—		

CHEMICALS

f.o.b. shipping point

Alum (Papermakers)—			
Lump, cwt.	5.05—		
Ground, cwt.	4.80—		
Powdered, cwt.	5.10—		
Blanc Fixe—			
Pulp, bulk, ton	100.00—		
Dry, barrels	105.00—		
Bleaching Powder—			
Drums, cwt	5.00	to	6.00
Casein (Domestic Standard) 20-30 mesh (bags), lb.			
80-100 mesh (bags), lb.	27.00	to	29.00
Argentine, lb.	22.50	to	23.00
China Clay—			
Domestic Filler			
Bulk (mine) ton	10.00	to	13.00
Domestic Coating			
Bulk (mine) ton	17.00	to	25.00
Imported (ship side)			
Bulk (lump) ton	20.00	to	30.00
Chlorine—			
Tank cars (wks) cwt.	2.92—		
Gelatine (silicon), lb.	1.25	to	1.35
Glyc. (C.P.) drums, lb.	.29½	to	.30
Litharge, pwd. bbl. lb.	.16½	to	.17

MARKET QUOTATIONS

Basis (Gum)— New York, per 100 lbs.

E	9.10—
F	9.10—
G	9.10—
WW	9.35—

Rosin (Wood), carlots, F.O.B. South .... 5.75—

Salt Cake—

Dom. bulk (wks) ton	28.00 to 29.00
Imp. bulks on dock— (Atl. ports) ton (Nom.)	22.00—

Soda Ash—

Bulk (works) cwt...	1.35—
Paper bags, cwt.....	1.70—

Soda (Caustic)—

Solid drums, cwt....	3.85 to 4.50
Ground and flake, drums, cwt.....	4.25 to 5.00

Sodium Silicate—

60 deg. 55 gal. drums, (works) cwt.....	1.60 to 1.70
40 deg. 35 gal. drums, (works), cwt.....	1.35 to 1.40

Starch—

Pearl, 140 lb. bags, cwt.	6.39—
Pearl, barrels, cwt...	6.39—
Paper (Sp.) bags, cwt.	6.39—
Powdered, barrels, cwt.	6.60—

Sulphur (Crude)

(Mine) bulk, long ton	26.50 to 28.00

Talc—

Dom. 100 lb. bags (mine) ton	25.00 to 28.00
Canadian	35.00 to 45.00

Titanium Dioxide—

Barium Pig, bbls., lb.	.22½ to .23
Calcium Pig, bbls., lb.	.22½ to .23
Zinc Oxide, bags	13.50 to 15.50

WOOD PULP

Quotations on domestic and Canadian wood pulp, dollars per short air dry ton, delivered consuming mills including basic freight allowances, follow:

Bleached Sulphite ....145.00—
Bleached Sulphite, Canadian .....145.00—
Unbleached Sulphite ...120.00—
Unbleached Sulphite, Canadian .....125.00—
Bleached Soda .....142.00 to 142.50
Bleached Soda, Canadian.142.00 to 142.50
Kraft Bleached .....147.00 to 150.00
Kraft, Bleach., Hardwood .....145.00—
Kraft, Bleach., Southern.150.00—
Kraft, Bleach., Canadian.150.00—
Kraft, Unbleached, Northern .....132.50—
Kraft, Unbleached, Southern .....115.00—
Kraft, Unbleached, Canadian .....110.00 to 115.00
Kraft, Semi-Bleached, Southern .....130.00 to 135.00
Sulphite Screenings .... 72.50—
Sulphate Screenings .... 67.50—
Groundwood ..... 75.00 to 85.00

Quotations on imported wood pulp, dollars per short ton, on dock American Atlantic ports with varying freight allowances, follow:

Bleached Sulphite, Swedish .....142.50—
Bleached Sulphite, Norwegian, freight allowed.142.50—
Bleached Sulphite, Finnish, freight allowed..145.00—
Unbleached Sulphite, Swedish .....125.00—
Unbleached Sulphite, Finnish freight allowed..125.00—
Kraft, Unbleached, Swedish, freight allowed..110.00 to 115.00
Kraft, Unbleached, Finnish, freight allow.110.00 to 140.00
Kraft, Bleached, Swedish, on dock....147.50—
Kraft, Bleached, Norwegian .....147.50—

PAPER

Quotations are mill quotations New York City

Boards—

Prices per ton, delivered in New York, 10 tons or more:

Plain chip	85.00—
News vat lined chip ...	90.00—
.009 chip, rolls	90.00—
Filled news	85.00—
Solid news	90.00—
White vat lined chip..	125.00—
Chip tube and can stock.	100.00—
Single manila lined chip.	140.00—
Single jute lined chip..	135.00—
Kraft liner	125.00 to 132.50

White patent coated:

.020	155.00—
.018	157.50—
.016	160.00—

Book Paper f.o.b. New York— per cwt.

Machine coated, two sides
70 lb. No. 2 enamel; 25x 4 cases $17.25
38-500, trimmed 4 sides. Carloads $16.30
45 lb. enamel, 25x38-500, 4 cases $13.05
trimmed 4 sides..... Carloads $12.10

Uncoated
55 lb. No. 2 offset, 25x38 4 cases $14.80
500, trimmed 4 sides.... Carloads $13.85
50 lb. A Grade English Finish, 25x38-500, un 4 cases $14.05
trimmed ..... Carloads $13.10
20 lb. envelope, 17x22-500, untrimmed ..... Carloads $12.40
16 lb. tablet, 17x22-500 ..... Carloads $11.35

Rag Content Bond—
(White, 5,000 to 10,000 lbs., basis 16 lb.)

100% rag.....	58.80—
75% rag.....	45.45—
50% rag.....	36.20—
25% rag.....	29.70—

Rag Content Ledger—
(White, 5,000 to 10,000 lbs.)

100% rag.....	58.80—
75% rag.....	45.45—
50% rag.....	36.20—
25% rag.....	29.70—

Sulphite Bond—
(White, 5,000 to 10,000 lbs., basis 16 lb.)

No. 1.....	20.10—
No. 2.....	26.40—
No. 4.....	17.75—

Sulphite Ledger—
(White, 5,000 to 10,000 lbs.)

No. 1.....	20.50—
No. 2.....	19.75—
No. 4.....	18.15—

News delivered in New York— per ton

Rolls, Standard (Contract)	125.00 to 126.00
Rolls (Spot)	(Nominal)
Sheets	138.00—

Tissues (Carlots) f.o.b. New York— per ream

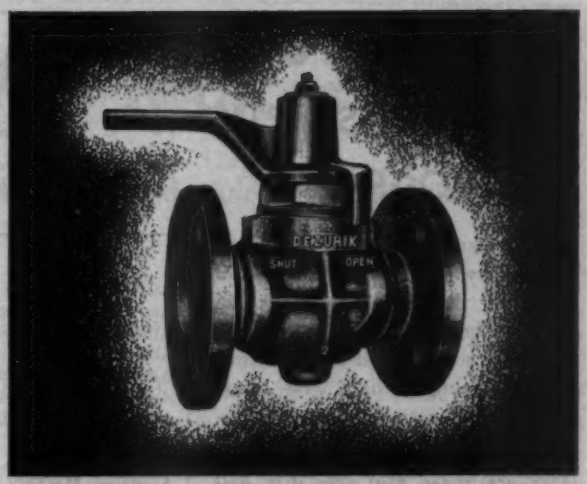
White No. 1.....	1.75—
White No. 2	1.35—
Bleached Anti-Tarnish..	2.20—
Colored	2.00—
Anti-Tarnish Kraft ..	1.65—
Manila	2.00—
Napkins, semi-crepe (12½ lb. to M shts.) per cs.	1.00—
Napkins, full crepe and embossed (12½ lb. to M shts.) per cs. ..	1.00—
Toilet, Bleached (M shts.) per cs.....	9.35—
Toilet, Unbleached (M shts.) per cs. ..	7.90—

Towels f.o.b. New York— per case

Bleached	6.80—
Unbleached	5.90—

Wrappings (Kraft) f.o.b. New York— (Basis 50 lb. & heavier) per cwt.

Standard wrapping	8.25—
Butchers, counter rolls..	8.50—
Standard bag, mill rolls.	7.75—
Shipping sack, mill rolls.	8.00—
Gumming, mill rolls....	8.25—
Asphalting, mill rolls...	8.00—
Envelope, mill rolls....	9.50—



DeZURIK EASY-OPERATING NON-LUBRICATED
PLUG VALVES
PROVED PERFORMERS
IN SO MANY MILL APPLICATIONS

Basis Weight Control
Stock Chest Level Control
White Water Chest Level Control
Automatic Knock-down Shower Valve
Liquid Alum Distribution System
Liquid Size Distribution System
Clay and Stock Slurries
Throttling Stock of Jordans or Refiners
Manual and Remote Pulper Dump Valves
3-Way and 4-Way for Multiple Jordan Hook-up
Beater or Slush-maker Makeup Water
Compressed Air
and many, many others.

WRITE FOR DETAILS AND RECOMMENDATIONS

DeZURIK SHOWER CO.
SARTELL, MINNESOTA

PUT ACTION IN YOUR SAFETY PROGRAM

Add a touch of showmanship to your safety program. Films let you tell your training story with the dramatic impact of pictures . . . action . . . sound. You can cut your safety training in half, give fewer refresher courses and get better results by using training films.

Here are three film sets that will help you arouse and keep alive interest in your safety program. And there is no better way to teach foremen how to be better supervisors.

SPEAKING OF SAFETY

A brand new set of films that will teach your foremen and supervisors the tips they should know about making safety talks, and how to transmit management's ideas and plans. Six 35mm sound slidefilms and leader's manual in an attractive leatherette case.

HUMAN FACTORS IN SAFETY

This is a series of six 35mm sound slidefilms with leader's manual that may be used for an advanced safety course. Each film deals with one aspect of the complex art of handling people. Collectively, the films show how to train workers, how to keep experienced people on their toes and how to win respect, cooperation and loyal support.

SAFETY MANAGEMENT FOR FOREMEN

A set of ten 35mm sound slidefilms—all that is needed for a course in safety fundamentals. The films explain how to organize a safety program, what part the foreman plays in the program and how safety increases production. They also discuss specific safety activities, such as machine guarding, safety inspections, the first aid program, etc. Complete with leader's manual in an attractive leatherette case.

Write for complete information and details to the

NATIONAL SAFETY COUNCIL

425 North Michigan Ave., Chicago 11, Illinois

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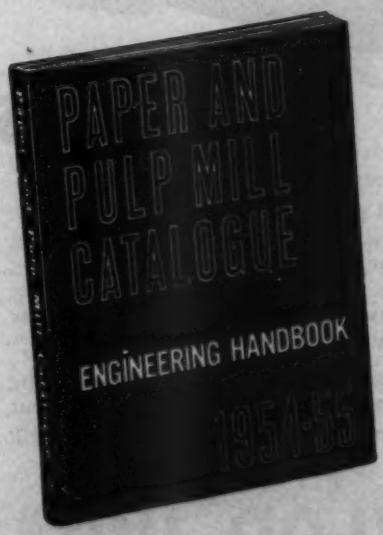

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TISCO®

MANGANESE STEEL
Barking Drum Chain

prevents costly shutdowns

The slap and pound of barking drum chains on their sprockets provide ideal work-hardening conditions for TISCO Manganese Steel Barking Drum Chain. That is why this durable product lasts from two to nine times as long as other types used in this severe service.

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IRON & STEEL CO.
(Division of HARRISBURG STEEL CORPORATION)

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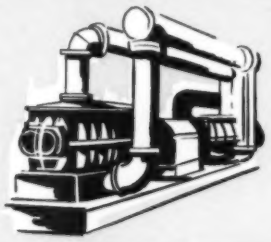
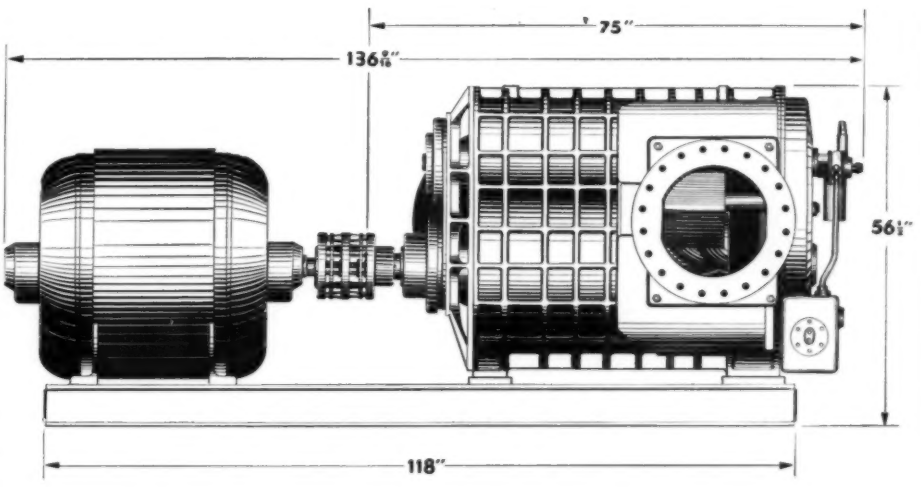
Birmingham, Ala.; Cincinnati, O.; Easton, Pa.

Vacuum Pump Users:

why use two-





400 HP motor
1200 RPM

Standardaire 175x32 Vacuum Pump
75 inches in length, weighs approximately 8,000 lbs.

WHEN ONE WILL DO!

A *Standardaire* Vacuum Pump with low horsepower and single-stage simplicity will do the same job for you as most double-stage pumps . . . and for less.

For example, the *Standardaire* 175x32 Single-stage Vacuum Pump operating at 1200 RPM is conservatively within the range of a 400 HP motor and gives the following tested CFM capacities—

20" HG	*22" HG*	*24" HG*
8,800 CFM	8,600 CFM	8,300 CFM

Figure what this means to you in savings. You can cut production costs, and save on floor space, too. This is possible because the ruggedly built, compactly designed *Standardaire* Pump offers you greater capacity per pound of pump than other pumps of equal weight and size.

Should you wish to stage two *Standardaires*, the same high capacities are achieved with a 25% saving in horsepower.

What's the secret behind the *Standardaire* capacities? Simple, rugged construction and *Standardaire's* exclusive, cycloidal screw type rotors which compress air in a wide range of pressures with a minimum of internal leakage.

There's a *Standardaire* Vacuum Pump designed to meet your exact requirements. Get all the facts today, write . . .

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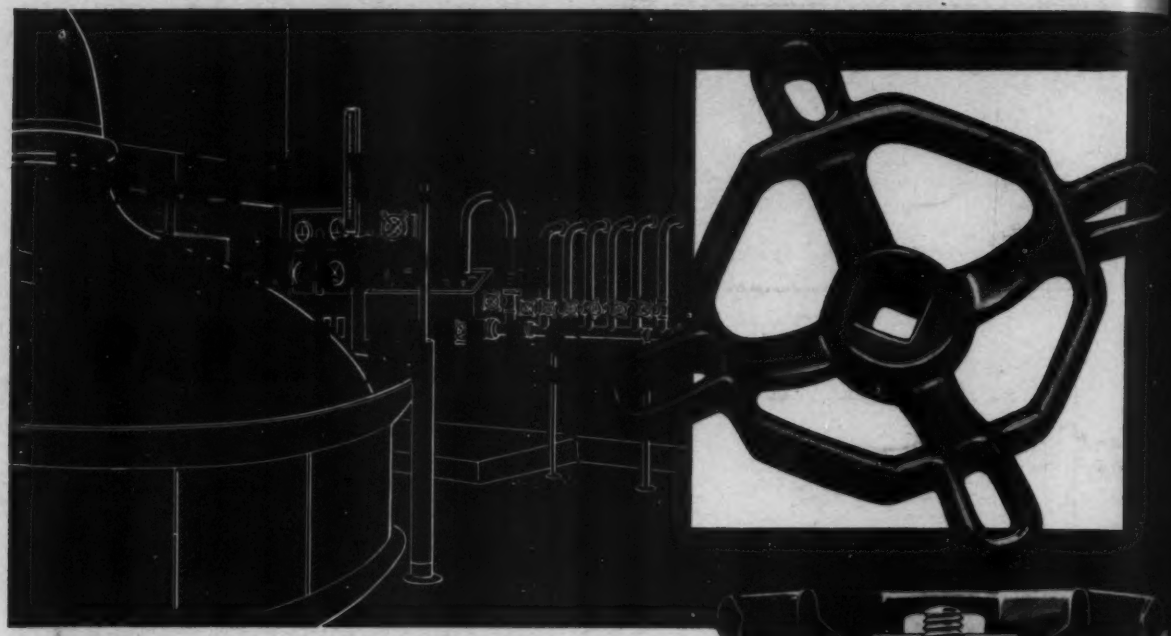

New non-slip® HANDWHEEL

Closes Lunkenheimer Valves Tight!

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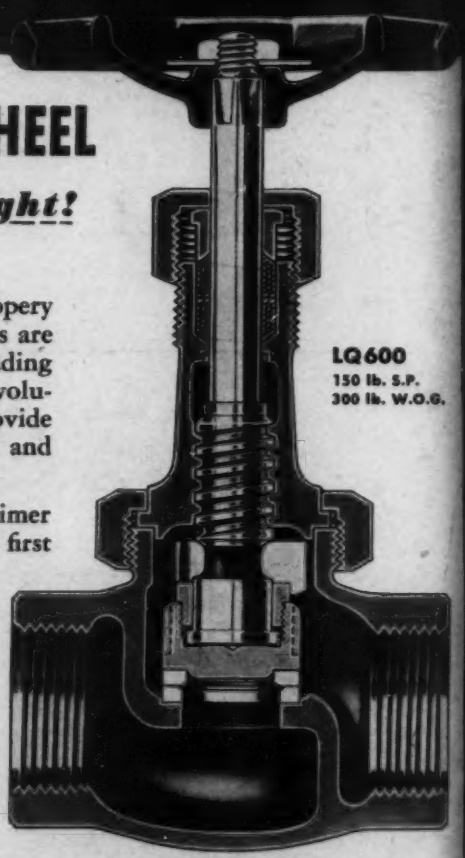
LUNKENHEIMER QUALITY

REQUEST the new Circulars describing the Non-Slip Handwheel and the new LQ600 Valve, from your local Lunkenheimer Distributor or from The Lunkenheimer Company, Box 360X, Cincinnati 14, O.

* *Patented Alloy*



LQ600
150 lb. S.P.
300 lb. W.O.G.

The cost of a Lunkenheimer Valve gets smaller and smaller and smaller with each passing year of dependable service.

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